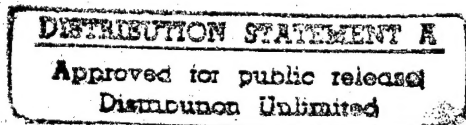


Asian Economic Prospects and Challenges, 1995-2010

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A handwritten signature in black ink, appearing to read "Jerome H. Kahan". The signature is fluid and cursive, with the first name "Jerome" and last name "Kahan" clearly distinguishable.

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The Research Memorandum represents the best opinion of CNA at the time of issue. It does not necessarily represent the opinion of the Department of the Navy.

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Summary

The Commander of Seventh Fleet asked the Center for Naval Analyses (CNA) to assess the security environment of the Asia-Pacific Region (APR) between now and 2010. This research memorandum focuses on the most probable economic trends in the region. The project's final report¹ discusses the implications of these trends (and of probable trends in other areas of transnational concern, as well as in individual countries) for U.S. forces, particularly the Navy.

Economic trends and prospects

Asian economic prospects through 2010 remain extraordinarily favorable. The fundamentals all favor continued high growth. Nothing short of extended, large-scale military conflict involving major economies and disrupting maritime traffic is likely to keep the region from averaging, from now through 2010, at least a 7.5- to 8-percent annual regional growth (excluding Japan).

Trade and capital inflows will grow 10 to 12 percent or better annually, augmenting the region's weight in global trade and currency matters. Growing mineral, food, energy, and other bulk-cargo import requirements are likely to quadruple maritime traffic in the region. Asia will extend and expand its already substantial global market dominance in electronics, automotive, aviation services, and electric power sectors.

The period 1995-2010 will be characterized by intensifying intraregional competition for capital, technology acquisition and development, and human skills. In the process, economic integration

1. CNA Research Memorandum (CRM) 95-172, *The Dynamics of Security in the Asia-Pacific Region*, by M. Lyall Breckon and Thomas J. Hirschfeld, January 1996.

incorporating the 12 leading economies of the region will expand and deepen steadily. Asia will continue to depend substantially on the U.S. marketplace, but this dependence will gradually become secondary to other Asian market opportunities.

Under pressure from national business interests, the Association of Southeast Asian Nations (ASEAN), the Asia-Pacific Economic Cooperation (APEC) forum, and now the ASEAN Regional Forum (ARF) will play increasingly powerful roles in the sustenance and nurture of the region's peaceful preoccupation with economic development and cooperation.

Japan will remain by far the dominant economic influence throughout the region. Up to 2000 it will extend its influence mainly through its expanding aid flows, its lending, and its reinvestment of growing offshore earnings from previous Japanese investments in Northeast and Southeast Asia. Thereafter, direct investment outflows from Japan will again become its main source of offshore expansion. By 2010, over 25 percent of Japanese production will be offshore in Asia.

As the Asia-Pacific Region becomes more tightly interdependent, it will also become increasingly vulnerable to economic perturbations within Asia and, to a lesser extent, to fluctuations in Europe and the United States. China will remain a highly volatile influence, continuing its cycle of stop-and-go expansions, but with less amplitude as it refines its macroeconomic policies and institutions.

The future course chosen by China's leaders is the most important of a number of critical uncertainties, or "wild cards," that will influence Asia's economic future. Whether it resumes aggressive economic reform or follows the more conservative and nationalistic policies now ascendant will make a difference in overall regional growth rates of as much as 1 percentage point.

Other critical uncertainties include food, water, and energy deficits, whether there is a soft or hard landing for North Korea, prospects for trade liberalization, and how Asian nationalism plays out. None is expected to affect growth prospects significantly.

Technology

Asia's increasingly integrated regional markets will progressively set the terms for international competition in technology as well as goods. Growing shortages of skilled workers, engineers, and managers will add to the competitive pressures to expand and elevate levels of education, technology, and capital per worker that are driving the area toward leadership in global technology.

Not only Japan, but also Korea and Taiwan, will become technology originators, especially in electronics. Singapore and, with a lag, Malaysia, and, after 2000, India, Thailand, and possibly Indonesia, will become technology integrators, innovators, and producers. Together, the two groups will dominate global production in selected fields and will educate higher proportions of technologically advanced workers, engineers, and scientists—relative to their economic size—than the United States.

China in particular and India to a degree have exceptional potential to leverage major acquisitions of advanced technologies by imposing conditions on access to their huge domestic markets. They will insist on transfer of advanced foreign technology and its use in-country in projects for aviation, electric and nuclear power, telecommunications, and defense.

Environment, resources, and energy

Rapid industrialization, urbanization, population growth, and resource exploitation, combined with neglect of environmental consequences, have accelerated accumulation of problems and costs that could slow or thwart future growth in many areas of Asia. Leading problems are:

- Air pollution. Except for Japan, emissions of Asia's largest CO₂ polluters, accounting for 20 percent of the world's output of this pollutant in 1990, will grow. China's efforts to sustain high growth require rapid expansion of energy, most easily and extensively by using its virtually inexhaustible supply of high-polluting sulfurous brown coal.

- **Urbanization.** Heavy concentrations of air, water, and waste pollution, quite apart from devastating cost increases, economic inefficiencies, and degradation of the quality of life, will undermine growth of the most affected urban areas if they continue to be neglected.
- **Water supplies.** Urbanization, population growth, and industrialization will encroach extensively on agricultural land and place tremendous demands on available water supplies.

Asia has already dramatically expanded its share of global demand for resources, from a quarter in 1985 to roughly a third of most mineral and energy resources currently. The region is likely to become an increasing importer of a number of major commodities, including energy. Energy requirements will make Japan and China in particular heavily dependent on Middle Eastern sources. This dependence is likely to lead to direct Asian differences with the United States over policy in the Middle East in the event of future crises in that area.

The prospect of major food shortages—mainly affecting China toward 2010—constitutes both an alert to national leaders and a major opportunity for extensive international cooperation led by the United States to forestall a crisis (e.g., through long-term grain supply agreements and technology assistance to offset production shortfalls through improvements in storage and transportation).

Other problems and constraints

The effects of rapid regional development will confront Asia with major challenges that have the potential for limiting or constraining future growth. These challenges include persistent and growing shortages of power and other elements of infrastructure and overregulation (Japan and Korea). Aging populations in Japan and Hong Kong will reduce savings rates slightly by 2010. Peaking of work force participation rates will also reduce one source of previous productivity gains in several of the fastest-growing economies. Another bottleneck will be greatly intensified congestion and hazards in ports and sea lanes as maritime traffic quadruples by 2010.

Implications for the United States

There is no foreseeable possibility that the United States, with a per capita capital investment rate one-half to one-third that of most Asian economies, can increase productivity growth to keep pace with those economies. Thus, the United States will face steadily increasing trade deficits with a growing array of Asian countries as more industries are relocated to ASEAN, China, India, and Vietnam from the more high-cost, advanced-service, and technology-oriented economies. U.S. surpluses in service earnings with Asia will also grow, but not by enough to keep overall U.S. current account deficits with Asia from rising. This will create market pressures for continued long-term dollar depreciation against Asian currencies, especially against the Japanese yen, Taiwan dollar, and Korean won.

As already large Asian foreign exchange reserves expand, Asians will increasingly be holders and buyers of U.S. securities, linking our financial markets ever more tightly to Asia. Absolutely and relative to the dollar, the yen will grow in importance in regional foreign exchange holdings and financial transactions and as a key currency as regional indebtedness to Japan grows.

Maritime congestion will grow in sea lanes critical to the United States. Together with hinterland developments in China, this will intensify the search for alternative land and sea routes through and to the region.

Growth in Asia's demand for oil will put substantial upward pressure on energy prices later in the period, although complexity of the market and volatility of supply factors make it impossible to quantify the effects.

Intraregional technology competition and the ascent of globally dominant Asian markets will greatly heighten Asian competition with the United States in advanced and emerging technology industries. Ease of technology transfer and low-cost Asian engineers and technical workers will severely challenge U.S. ability to expand technology jobs and constrain our ability to remain competitive through progressive dollar depreciation. Asian acquisitions, investments, and strategic

alliances involving U.S. technology firms and research will accelerate and become a leading feature of U.S.-Asian economic relations.

The biggest challenge posed by Asia's economies for the United States between now and 2010 will be to adjust American thinking and policies to a world in which Asia accounts for over a third of global product and nearly 40 percent of global trade, and increasingly dominates and shapes international markets, economic systems, technology development, institutions, and policies, with decreasing deference to U.S. interests and concerns.

The ability of U.S. leaders to recognize, let alone to acknowledge and act on, that prospect and its already visible implications is seriously impeded by multiple factors. These impediments include distance and isolation from Asia (especially the paucity of Asia-Pacific organizational ties as compared to ties with Europe); increasing preoccupation with domestic issues; aggressive unilateral assertion of U.S. trade and market access interests; eclipse of bipartisanship in foreign policy; severe reductions in federal budgets and functions relating to conduct of foreign relations; near-termination of U.S. economic assistance to Asia; growing congressional indifference to objective, non-partisan assessments of foreign realities; and a growing tendency among politicians toward macho unilateralism in foreign affairs. These factors place an increased burden of education and engagement on institutions with important responsibilities in the world beyond U.S. borders, including the U.S. Navy.

General policy recommendations

Regional economic presence and influence are necessary for the United States to protect important and growing political, security, and economic interests in Asia. An integrated policy framework that balances goals and gives more explicit weight to policies that increase U.S. influence is needed. Exceptional measures will be needed in the Asia-Pacific Region of the next century:

- Much greater support for U.S. exports and investments in Asia
- Greater recognition of and involvement in energy, food, and environmental challenges facing Asia

- Greater efforts to develop and apply U.S. technological advantages to these challenges before they threaten U.S. interests.

Rapid growth of Asian sources of technology, through commercial acquisition and, later in the period, development of indigenous R&D, including dual-use technologies with military applications, should be carefully monitored. Limiting its spread to countries that threaten U.S. interests will be a major goal.

Because of China's size and the influence its rise will have on the future of Asia, the economic dimension of U.S.-China relations will have broad effects on the region. A policy of engaging China as a means of encouraging it to play a responsible role in accordance with international norms should include extensive efforts, in cooperation with Japan, to help China deal effectively with its water, food, and energy challenges.

Recommendations for the U.S. Navy

The consequences of 15 years of sustained high Asian growth are likely to affect the Navy more heavily than other services. Much of the impact will evolve around the congestion in maritime transport, the expansion of navies in key Asian countries, and rising costs of forward positioning as Asian currencies appreciate. With these considerations in mind, we recommend that the Navy do the following:

- Work for greater recognition of, and focus on, Asian realities and opportunities in U.S. policy formulation.
- Monitor Asian regional economic developments closely for an understanding of the effects of trade, investment, and technology patterns on security.
- Conduct a periodic assessment of the adequacy, safety, and security of Asian straits and sea lanes. If the findings raise serious concerns, take the lead in coordinating with naval and maritime officials of key Asian littoral powers to explore solutions.
- Show constructive interest in facilitating and protecting peaceful commerce in Asia by offering to help solve problems, e.g., suggesting or providing navigational and other shipping safety

aids, and port and harbor development. The U.S. Coast Guard and the Maritime Administration should be involved.

- Broaden existing programs for monitoring electronics, communications, information, transportation, and other technology developments in Asian countries, and consider sponsoring select research and development projects with Asian partners that may have applications relevant to defense, naval, navigation, safety, environmental, or other problems.

Introduction

Overview

This research memorandum documents part of a larger study for Commander, Seventh Fleet, of the security environment of the APR between now and 2010. It assesses the dominant economic trends within the region and how those trends will affect prospects both for Asia as a whole and for the main economies within the region by 2010.² The study analyzes the region mainly in terms of groups of economies with shared or similar characteristics and behavior.

Most central to this assessment are the economies of:

- Japan
- Four Asian newly industrialized economies (ANIEs)—Hong Kong, South Korea, Singapore, and Taiwan
- Four countries of the Association of Southeast Asian Nations (ASEAN)—Indonesia, Malaysia, the Philippines, and Thailand³

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2. For convenience, this study uses the term “Asia” to include East and Southeast Asia; it also includes India because of that country’s expanding ties with the other economies of the region.
 3. This group excludes Singapore, which is grouped with its functional peers, the ANIEs. Brunei, which became the sixth member of ASEAN in 1989, is of predominant importance as a major oil and natural gas producer. It is excluded from this discussion primarily because it fits very marginally into the industrialization pattern at the center of this analysis.

- Three emerging market industrial economics (EMIEs)—China, Vietnam, and India.⁴

The most important features of the economies of the eight ANIE and ASEAN countries above, from a regional perspective, are their market-driven policies and the extent to which they are involved in intraregional flows of foreign direct investment (FDI). Such investment is a key driver of current regional economic trends, and particularly of regional economic integration.

The 12 economies listed above interact most extensively with others in the region, are most integrated into the regional economy, and will have the most significant impact on the future of the region. The study also addresses the prospective impact of other economies that are gradually being drawn into Asia's economic orbit in varying degrees—those of Australia, Myanmar, and the Russian Far East.⁵

Asia will certainly remain the world's fastest-growing, fastest-changing region well into the next millennium. Rapid change usually makes forecasting especially hazardous. Yet the persistence and stability of trends in the emerging pattern of Asian economic relationships suggest a degree of coherence, continuity, and especially interrelatedness that makes projecting the region's prospects much less risky than if they were driven by nationalism, ethnicity, security, or political balance of power considerations.

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4. Vietnam joined ASEAN in July 1995 but is treated along with the other emerging economies because it is still configured so differently from that of other members while it is undertaking the transition from a managed, command economy toward a more market-oriented system open to foreign investment. Including India in an Asian study is unorthodox but essential. With the economic reforms introduced by Prime Minister Narasimha Rao since 1993, India has aligned its economy increasingly toward East Asian policies and practices and has promoted increasing interactions and competition with that region. Because of its realignment and economic size, India must now be considered a major player in the region.
 5. The study considers North Korea together with South Korea, but includes Cambodia and Laos only insofar as certain regional data occasionally incorporate them.

What makes regional economic dynamics uniquely high-impact in Asia is the extraordinary extent and power of economic interactions within the region, impelled by a high degree of intraregional economic and developmental complementarity. For most Asian economies, prospects for the region as a whole become increasingly important in shaping their own outlook. To an extraordinary degree, each group of economies offers unique advantages to other economic groups, whether surplus capital, technology, energy and mineral resources, abundant labor, management skills, or some other resource needed by other groups. In addition, because each group is at a different stage in economic development than other groups, each also has special advantages to share.

Rapid growth of intraregional trade is a good gauge of the importance of these interactions, but trade consists much more of one-time or short-term transactions than does foreign direct investment. Direct investment typically involves longer-term and more deeply rooted commitments, and often joint ventures, technical licenses, or strategic alliances. Because investment almost always has an important impact on trade as well, this analysis gives particular attention to foreign direct investment and related trade as the main functional relationship driving and reflecting regional dynamics and trends.

Organization of the study

The study begins with a discussion of underlying economic forces and a review of Asia's economic evolution. After analyzing strengths, constraints, and a number of critical uncertainties over the next decade, it projects regional and country growth rates through 2010, comparing these with other regions and global trends for perspective. Effects of growth rates for trade and seaborne commerce are given special consideration, as are the prospects for economic relations between the United States and Asia in this time frame.

In subsequent sections, the paper evaluates prospects for the spread of technology throughout the Asian economies, and weighs environment, resource, and energy factors arising from the growth projections.

The final section of the paper presents findings, conclusions, and policy recommendations for the United States generally, and the Navy in particular.

More detailed discussion of the growth and patterns of Asian economic integration are in appendix A. Appendix B discusses the outlook for specific countries and regions.

Economic integration in Asia has been driven by private sector energy and initiatives supported by governments that provide either permissive or encouraging market-oriented policies. This contrasts with Europe, where the private sector encouraged regional agreements and government efforts to lead and shape integration. Some see Asian "growth triangles" or natural economic zones as an especially important mechanism of Asian integration and identify roughly a dozen such triangles. These include a few areas where unusually high growth has concentrated at the intersection of several economies, such as areas of China adjacent to Hong Kong, and areas of Indonesia and Malaysia adjacent to Singapore. This study treats such triangles more skeptically, as exceptional only in two cases where very strong core economies (Hong Kong and Singapore) provide the impetus for localized integration. Appendix C identifies those growth triangles and provides a brief assessment of them.

Underlying economic forces

Broadly speaking, Asia's past two decades of extraordinary economic accomplishments and successes have four main origins.

First, they grow out of a prevailing emphasis on export-market-oriented economic development as the best path to national strength. Within this objective, Asian governments have implemented a battery of market-oriented, export-led policies that have been exceptionally effective in producing rapid, balanced, equitable economic growth and development.

Second, as Asians have needed to acquire markets and resources (metals and minerals, energy, aid, private capital, lower-cost production sites), they have found it increasingly advantageous, easy, and convenient to seek them mostly in neighboring Asian economies.

Third, Asia has been blessed by an array of economic complementarities that, in diversity and magnitude, are unparalleled in history. These complementarities in turn attracted investment increasingly from within the region, leading to rapid expansion of regional economic integration. These regional advantages and intensifying intraregional transactions have given an important boost to the underlying rate of regional economic growth.

Fourth, Asia's comparatively open access to the U.S. markets (as contrasted with Japan's) greatly facilitated export and industrial growth at rates that would otherwise not have been possible. Although this study focuses predominantly on Asian regional dynamics and intraregional integration, it also considers the important extent to which Asia is essentially a subregion of a much larger Asian-Northern American region (sometimes referred to as the Pacific Rim or Basin) with which it has become increasingly integrated. North America, primarily the United States, exerts its integrative influence as the leading market for Asian exports.

- With its slow but relatively steady growth and low volatility, the U.S. market has strongly supported Asian growth by assuring it of a long-term growth market for Asian industrial exports. The United States has absorbed roughly two-thirds of the export expansion of Asia's developing countries since the 1960s, thus probably permitting exports and industrialization to grow some 40 to 50 percent faster than might otherwise have been the case.
- This Pacific economic relationship has been sufficiently stable and predictable for us to assume its continuation and not treat it as a major variable in this study. However, U.S. political frustrations with mounting trade deficits with Japan, China, and the region as a whole could conceivably precipitate unilateral U.S. measures to limit Asian access to U.S. markets. The World Trade Organization and the APEC forum provide available buffers against that danger, and are nascent institutions that the United States has broad and important reasons to support through cooperation, but the danger should not be disregarded.

All four of these basic strengths and most of their components remain firmly rooted in 1995, and they overwhelmingly favor continuation of Asia's economic growth and integration successes to 2010 and beyond. However, the study also identifies five problem areas that require effective Asian responses if significant erosion of the region's economic edge is to be prevented: infrastructure deficits; incipient shortages of energy, water, and food; urbanization; population aging; and environmental problems and costs. These problem areas are discussed later in detail.

Asia's economic evolution since World War II

In the 1950s and much of the 1960s, developing economies had limited industrial sectors and faced the daunting prospect of trying to build infant industries in competition with imports from advanced industrial nations. Most gave priority to policies that created protective walls around new industries aimed at substituting domestic production for imports—so-called import-substitution policies. As these

economies developed extensive industrial capability, mainly in low-wage labor-intensive industries, high tariff barriers and other protective policies often became self-defeating, resulting in high-cost, inefficient enterprises. They increased costs and drained financial resources, making development of other industries prohibitively expensive.

Policy course correction: export-led growth

Disengaging from import-substitution policies in the late 1960s to mid 1970s, Asia's industrializing non-socialist economies progressively adopted an array of export-led policies, first implemented by Japan. The World Bank has identified these policies as instrumental in their unique successes. By the mid 1980s, socialist China and, in the early 1990s, Vietnam recognized the successes produced by these policies and began to emulate them. Because the characteristic qualities these policies produced are thoroughly catalogued and detailed in World Bank reports, it suffices to identify a few key aspects of Asian economies that distinguish them from most other developing countries and that the World Bank associates most closely with their successes.⁶

- Exceptionally high national savings and investment rates generally exceeding 30 percent of gross domestic product
- Sustained high rates of industrial growth
- Higher and faster-rising education levels
- Lower and faster-declining fertility levels, in turn making possible higher per capita expenditures on education, health, and other aspects of human capital
- Lower inflation levels, which in turn contribute to
- Lower levels of income inequality.

6. This summary of findings is based on *The East Asian Miracle: Economic Growth and Public Policy* (Oxford University Press, 1993).

National economic policies that complemented and built upon these advantages include:

- Market-oriented, export-led growth
- Early emphasis on agricultural reform and development
- Measures fostering high savings and investment rates, and directing capital progressively into industry and infrastructure
- High priority for elementary education, vocational training, and human resource investments generally.

In addition, as Asian economies expanded their range of industrial products, the need to keep export prices competitive made it particularly important to contain inflation and to keep intermediate and component costs low by liberalizing tariffs on their importation.

Continuation of these characteristics and policies will be essential for Asia to be able to sustain growth levels comparable to those of the past. Prospects appear bright. In particular, national savings and investment rates have consistently remained at or near peak levels, ensuring the ability of the region to sustain additions to its infrastructure, production base, and human capital enhancement that have been main contributors to its growth. Even the lagging economies such as those of India and the Philippines are beginning to catch up.

The region has also demonstrated sustained success at maintaining export-oriented policies and moderate inflation (except for China). Prospects remain bullish because of enormous and growing backlogs of demand for infrastructure and consumer demand stimulated by rapidly rising incomes. Growing regional export surpluses have built foreign exchange reserves—particularly in Japan, Taiwan, China, and Singapore—to extraordinary levels, far above the global standard of three months' import equivalence. Moreover, because of high domestic savings levels and the favorable climate for foreign direct and portfolio investment, this exceptional record has been achieved with low levels of foreign debt and mostly even lower levels of debt servicing, factors that otherwise might undermine growth prospects in the long run.

Constraints

Still, there are constraints and negative aspects to Asia's development. Despite the market-oriented, private-sector attributes of their policies, every Asian government except Hong Kong has also substantially intervened to promote, protect, shape, supplement, or supplant private enterprise either in general or in selected sectors. In particular, those governments generally maintained high tariffs or other barriers on those imports that compete with goods produced internally and primarily for the domestic market.

In Taiwan, where firms were predominantly small or medium-size family enterprises, government-created state enterprises in heavy industry and key sectors where size and economies of scale were considered important for international competitiveness.⁷ In South Korea, the government has intervened extensively to attempt to create competitive advantages for national industries. It provided protection from imports, heavily subsidized research, and promoted acquisition of industrial technologies for capital- and resource-intensive industries in which traditional economic theory would judge Korea, lacking these factors, to be at a comparative disadvantage—for example, shipbuilding, heavy construction, petrochemical, and automotive industries. Whether or not these efforts are fully attributable to government policies, they did result in viable and, in some cases, world-class industries.

This assessment concludes that several economies in the region are growing at levels well below their potential because of excessive protection, regulation, and exclusion of foreign capital and competition. Particularly Japan, but also Korea, China, India, and Vietnam, have a long way to go to realize a fully sustainable growth potential that depends on extensive liberalization of their economies. Most others could also clearly benefit from liberalization. These

7. Robert Wade, *Governing the Market Economy: Economic Theory and the Role of Government in East Asian Industrialization* (Princeton, NJ: Princeton University Press, 1990), 82; also chapter 2 of *Taiwan in World Affairs*, Robert G. Sutter and William R. Johnson, editors (Boulder, CO: Westview Press, Inc., 1994).

governments have been reluctant to dismantle protection and intervention, most often from concerns to protect national industries, workers, and social groups. Pressures to liberalize have grown from (1) tradeoffs in exchange for improved foreign market access in GATT negotiations, (2) recognition of the value of liberalization in attracting foreign investment, and (3) damage to competitiveness in sectors protected from competition and exposure to international advances. Still, bureaucratic resistance has slowed progress and often led to substitution of non-tariff barriers as tariffs and quotas have been reduced or eliminated. Yet the breadth and intensity of competition within the region has increased pressures for reducing protectionism in a growing number of sectors.⁸

In addition, problems of maturation will confront a number of Asian economies beyond 2000 because of continued high growth. A recent study finds that four main factors have made key contributions to the remarkable growth rates in manufacturing in the four Asian newly industrialized economies (ANIEs):

- Rapid increases in labor force participation, particularly by women
- Expansion of the industrial work force by transfers from agriculture and other sectors with underemployed labor
- Increases in worker education and training levels
- Additions to capital per worker.⁹

Because worker participation rates in most ANIEs are now approaching those in more developed industrial nations, they can expect contributions to production expansion from this source to decline, especially because population growth has also declined and has

8. See Heginbotham, "Unleashing the Tiger: Market Forces are Driving the Asian Nations Toward Open Economies and Free Trade," *The Asian Wall Street Journal Weekly*, week of June 12, 1995, 15-17.

9. Alwyn Young, "The Tyranny of Numbers: Confronting the Statistical Realities of the East Asian Growth Experience," National Bureau of Economic Research, Inc., Working Paper No. 4680, Cambridge, March 1994, 44 pages.

stabilized at low levels. Large transfers of surplus labor from agriculture have long since ended. Percentages of students completing secondary school have risen rapidly to the 70 to 80 percent range, limiting room for further improvements in that respect. Expansion of college-level education on a broad scale requires much greater expense per student and delays additions to the labor force. However, the incentives to move rapidly in that direction grow stronger daily with intra-regional competition to acquire and develop new technologies as the driving force.

These trends increase the challenge and the costs to the ANIEs of sustaining high growth in the face of diminished prospects for these major contributors to growth. Hong Kong, for example, has lost so many young people through emigration in recent years that it has become the most rapidly aging economy in the region. Although those numbers could be offset, especially after 1997 by immigration from the mainland, the level of per-worker productivity may also be lower initially. Rapid growth has greatly expanded the demand for and increased the shortages of semi-skilled, skilled, and professional workers throughout Asia, causing marked increases in investments needed to expand the supply. In addition, direct investors are increasingly having to train workers in technical skills as an incremental cost of business. Finally, to the extent that ANIE population growth continues to subside, net additions to the work force also decline. On the other hand, three of these four economies (Korea being the exception) enjoy high annual capital surpluses and certainly have the means to sustain high levels of investment in worker education and training as well as new capital additions per worker.

Although ANIE work forces have not yet peaked in any of the four areas (participation rates, transfers, education/training, and capital per worker), they will all peak in two or three of these categories by the end of the century. Import of surplus workers from other Asian economies is becoming a minor but growing offset to skilled and unskilled labor shortages in all four. Overall, however, taken together, the declining rate of additions to work force participation and related additions to productivity are certain to cause a modest slowing in the rate of economic growth of the ANIEs after 2000, particularly in

Korea and Taiwan—probably an average of one percentage point lower than present rates by 2010.

The ASEAN countries are going more slowly through the same evolution, with a lag, after the ANIEs. Thailand and Malaysia are some 5 to 10 years behind the ANIEs, with Indonesia and the Philippines roughly 10 to 15 years behind. In Thailand, for example, skill shortages have become so serious that they are considered a key obstacle to continued high economic growth.

Regional growth dynamics and integrative forces

The foregoing policy strengths and success indicators apply in Japan, all four ANIEs, the ASEAN-4, and broadly in Australia. These countries have created a generally competitive growth environment. Their successes have stimulated emulation in neighboring economies at least partially and experimentally, with China, India, and Vietnam being cases in point.

Asian economic achievements go well beyond the sum of the growth rates of its component economies, however. The region has experienced an afterburner growth boost because of the extraordinary range of complementarities among its economies and the synergies that have resulted from their exploitation. Two types of complementarities are involved: in natural and human resources, and in differing stages of economic development. These complementarities shape the principal interactive dynamics of Asia and make it possible to have confidence in the trends, directions, and continuities in the region over the extended period to 2010 and beyond.

Dynamic interaction among Asia's five economic tiers

The principal complementarities occur among the four top tiers of Asian economies. As noted above, Japan is alone in tier 1. The four ANIEs constitute tier 2. The ASEAN-4, as aggressive aspirants to the class of newly industrialized economies, in hot pursuit of the ANIEs, currently constitute tier 3. In tier 4 are the three emerging market industrial economies (EMIEs)—China, Vietnam, and India—that

have taken important steps away from old socialist policies and practices toward export-oriented market reforms.¹⁰ The Russian Far East and Mongolia are currently part of the fifth tier of economies that have very limited economic interaction with the Asian-12.¹¹

These tier groupings are not immutable. As economies in lower tiers successfully advance their development efforts, some will qualify for higher-tier status. Malaysia appears closest to becoming the next ANIE or fifth tiger. Vietnam and some municipalities and provinces of China will become advanced EMIEs and incipient ANIEs within the next five years. Less likely but still possible is that Myanmar might introduce more meaningful reforms and openings in its severely controlled economy and become an EMIE. Still less likely is that the Russian Far East, which lacks market orientation, entrepreneurial experience, independent political leadership, capital, and infrastructure, might become a significant player.

What makes these complementary tiers meaningful is the phased way in which they have interacted with other Asian tiers through direct investment and other capital flows. (Appendix A discusses this evolution in detail.)

10. Australia's immense wealth of energy and mineral resources has long made it a valuable complement to Asia's vast resource needs and the continued recipient of major Asian direct and portfolio investments. Neither it nor New Zealand has participated significantly in the kind of interactive direct investment flows in manufacturing and advanced service industries that characterize relations among the four tiers described here. See pp. 156-158 for more on Australia.

11. This tier also includes Laos, Cambodia, Myanmar, and North Korea. The interactions they have with other Asian economies are mainly through the medium of black market and cross-border trade. Of these, Myanmar and Cambodia have taken limited steps toward the market. Myanmar has begun efforts to attract foreign investment in limited sectors and has enlisted Chinese help to improve its roads and cross-border links. North Korea, although its economic prospects are dim indeed, has begun measures to attract and promote foreign investment to the isolated Rajim-Songbong industrial estate near its borders with China and Russia. The main stimulus to Russian Far East involvement is the stream of immigrants from China who conduct much of its internal and cross-border commerce.

Phase I began the initial stage of complementarity in the late 1940s and 1950s when Japan's acute lack of energy and raw materials launched it into a global search to develop secure, stable, long-term supplies. A high percentage of Japanese resource investment went into Australia and tier-3 ASEAN countries, especially Indonesia.

Phase II, in the 1960s and 1970s, represents Japan's search to relocate some of its most labor-intensive industries in lower-cost economies, as rapid wage, land, and infrastructure costs severely eroded the competitiveness of its low-cost labor-intensive production. This phase was characterized by substantial Japanese direct investments and contract production¹² in tier-2 countries—Taiwan, Korea, Hong Kong, and Singapore—in textiles and other light industrial goods.

Phase III began slowly in the late 1970s and early 1980s when Korea, Taiwan, Singapore, and Hong Kong began to experience similar wage and other cost-push pressures. They and the Japanese found the ASEAN-4, an area with abundant low-wage labor and rich in energy, mineral, and tropical product resources, a highly attractive region for relocation of their cost-pushed industries.

Phase IV began with the Plaza Accord of September 1985, which introduced a powerful new stimulus into Asian regional economic integration and particularly into the cost-push relocation process. In this agreement the Group of Five (G-5) finance ministers from the United States, UK, Germany, France, and Japan committed to coordinate efforts for appreciation of the yen, which literally doubled in value over roughly a two-year period, from ¥240 per dollar in March 1985 to ¥120 by 1987. The Taiwan and Korean currencies appreciated by much less, but still significantly. By raising the cost of exports, these currency appreciations greatly intensified the cost-push relocation dynamic and roughly tripled foreign direct investment (FDI) flows from Japan and the ANIEs into Southeast Asia between 1986-91

12. Contract production is a rough functional equivalent of direct investment but avoids the obstacle of political hostility to Japanese-owned investments in Korea and Taiwan, formerly occupied by Japan. It involves contract arrangements under which the foreign firm provides production equipment and management and recoups expenses by gaining title to exported products.

compared with 1980-85, particularly to Thailand, Malaysia, and Indonesia. Japanese investments in the ANIEs also roughly tripled (and increased sharply in the United States and Europe).

In Phase IV, economic development throughout the region was greatly spurred by the downward cascade of FDI from the higher tiers. It quickly caused almost every economy in the region to outgrow essential infrastructure—power, roads, communications, ports, and so on—and generated considerable overexpansion of industrial production facilities, especially in Japan, but also in the ANIEs and ASEANs. Both increased infrastructure costs and excess capacity reduced attractions in the ASEAN, but a five-year high-growth period also brought into being a large, affluent middle class with abundant upscale consumer demands. Thanks to its accelerating economic reforms, China also added to the region's demand for infrastructure and consumer goods.

Phase V (demand-pull): The current phase of inter-tier dynamics began in 1992 and was led by the speed and magnitude of Chinese economic reform. The attraction of producing light industrial goods for export was supplemented from 1994 by the pull of massive new demand for infrastructure and internal Chinese consumer goods markets in attracting foreign capital. It brought a virtual tide of FDI into China, especially from Hong Kong and Taiwan, some of it lured away from the growing bottlenecks and complications in ASEAN in 1992-93. The earliest inflows also involved relocation of tens of thousands of small labor-intensive manufacturing plants from Hong Kong and Taiwan into southeast China.

In effect, today's Asian economic dynamics incorporate some aspects of all the foregoing phases, but are dominated by the most recent one. The growing backlog of infrastructure demand and the growth of consumer demand, especially in the fastest-growing economies (China at present), assure that demand-pull will remain the dominant dynamic ruling Asia to and beyond 2000.

An incomplete transition

In the second and third phases of regional interaction and integration, the principal tier involved essentially completed a transition to medium-wage economy status, losing its advantage in low-wage, labor-intensive industries to the next lower tier. Unlike these phases, the ASEAN-dominated Phase IV, through 1991, had not really fully run its course when it was dampened prematurely by its own overheated growth and China's dramatic emergence in Phase V. Although wages in most ASEAN economies (excluding, for now, Vietnam) are distinctly higher than those in China and India, the differences are not yet that great and are often offset by other higher costs and uncertainties of doing business in China; ASEAN and EMIE economies are much more directly competitive in light and medium industry than those of the lower tiers. As a result, over the next four to six years, we will see much more interaction between these two tiers than has been the case in earlier cycles. This means an alternating period or two when China and/or India may dominate capital markets, followed by a period in which ASEAN countries, including Vietnam, are able to regain favor. Since late 1994, the tilt has been modestly in ASEAN's favor because of a cooling off of the Chinese economy; greater awareness by foreign investors of the hazards, uncertainties, and other costs of investing in China; and strengthened ASEAN efforts to attract foreign investment both to meet its infrastructure and development needs and to combat Chinese success.

Because China is such a dominant factor in the future of the region, it is worth noting that the China-ruled Phase V has also added another distinctive feature to the cost-push process—its localization and decentralization. China's earliest hypergrowth favored the coastal provinces of Guangdong, Fujian, and Jiangsu, along with Shanghai, Tianjin, and other coastal municipalities, but caused local labor, land, fees, materials, corruption, infrastructure shortages, and other costs of doing business to rise very rapidly, pushing foreign investors to look to other provinces and municipalities further north and inland.

In sum, Asia owes a good deal of its dynamism to the high degree of complementarity in resources and development stages among its four

main tiers of economies, and to the accelerating flow of foreign investment and other intraregional interactions seeking to exploit those complementarities. The result has been the internally generated acceleration of economic integration and persistence of sustained high growth rates. As noted earlier, appendix A provides a more detailed account of the evolution of this regional interaction and integration.

The record also shows that the region is proving able to maintain at or near peak levels most of the economic strengths that made these achievements possible. On this basis, this study anticipates that the region will sustain continued high growth and regional economic integration mainly through market forces well into the next century.

Regional frameworks

Unlike Europe, where political and economic organizations preceded and guided regional economic integration and harmonization, Asia has seen export-oriented national policies, strong private sector leadership, and transnational transactions lead the integration process and slowly prod into existence two main regional organizations to support the process. Most influential has been the Association of Southeast Asian Nations. The six ASEAN countries in late 1994 reaffirmed their commitment of roughly a decade earlier to undertake progressive trade liberalization within the subregion by establishing the ASEAN Free Trade Area (AFTA) and setting 2005 and 2010 as target years for completion of extensive tariff reductions by all members.

The foundation of the APEC forum in 1989 has in four years led to a broad and apparently growing consensus of its 18 members to support ambitious trade liberalization goals. These were translated into specific measures reviewed at the leaders' summit in Osaka hosted by Japan in November 1995. Japan surprised many observers by showing impressive creativity in advancing the liberalization agenda. However, it has also thwarted the broadest applicability of liberalization by joining with Korea and China to oppose inclusion of "sensitive" sectors, mostly agricultural, that may be phased in after extended delay.

Even so, effective implementation of broad liberalization, if not undercut by new non-tariff barriers, would, over the coming decade, add at least one-half to a full percentage point to average regional growth rates by 2010 (allowing that the great majority of meaningful liberalizations will be concentrated toward the end of the period), and possibly more. Continued high growth in the region makes it easier politically and economically to implement such concessions. This prospect is one more factor bolstering chances for continued high regional growth.

The economic outlook through 2010

This forecast of the economic outlook for Asia through 2010 begins by considering the prospects for the four tiers that account for the vast majority of the regional economy. The analysis begins with a summary of the positive factors within the region, described in fuller detail in appendices A and B. Next we consider how a number of limitations, constraints, and uncertainties ("wild cards") might affect prospects for the region through 2010. Finally, this section projects estimates of performance for national economies and for the region overall.

Fundamentals favor high growth

The prospects for continued high Asian economic growth appear strong through 2010 and beyond. The most positive features of the Asian-12 are:

- Moderate and declining population growth, which is facilitating per capita gains from investments, but still supplying adequate growth in labor force participation.
- High and firm-to-strengthening savings and investment rates, including a strong mix of capital-surplus economies to supply the needs of capital-deficit economies.
- Massive and steadily growing backlog of infrastructure demands, which is more likely to increase than be reduced.
- Increasing trade and capital surpluses in a broadening range of economies.
- High and rising human capital values (education/skill levels, overall work force expansion).
- Rapid emergence of a strong middle class with associated increases in consumer demand.

- Continued high levels of complementarity among the four tiers of economies that lead in Asia's economic development.
- Related intensification of intraregional economic interaction and integration in investment, trade, business and tourist travel, education, and international infrastructure (transportation and communication).
- Continuation of market-oriented export-led reforms in India and Vietnam, progressively opening the fifth tier of former command or socialist economies to synergistic interactions with Asia's more advanced-tier economies; Myanmar and North Korea may follow, but much more haltingly.
- Prospective gradual resumption of more aggressive reforms in China after 1996, after further subsidence of current inflationary pressures.
- Emerging responsiveness to local human resource shortages, through policies to strengthen advanced education and technology training.
- Progress toward regional trade liberalization through APEC and the ASEAN Regional Trade Association.

Fortuitously reinforcing these strengths through the mid 1990s is the emergence of China as a substitute for Japan as the region's engine of growth. China's rapid expansion in 1992 came just as Japan's recession created a drag on the region's growth that was roughly synchronous with recession in the United States and Europe.

Tiers 1 through 3 now have established economic interrelationships that are unlikely to change dramatically by 2010. Their population and GDP growth rates will decline very slowly, within easily predictable ranges. Barring major natural calamities or major and sustained military conflicts, it is hard to imagine any scenario that would appreciably change the overall forecasts for these tiers.

Although most of these developments are generally known and well documented, the last of these items, progress toward regional trade liberalization, deserves special note. It is both a potential source of

strength for continued regional growth and one of the biggest challenges facing U.S. relations with the region, as is spelled out below.

Restraints and limitations

Emerging limitations on Asian economic growth are becoming more visible. Power, transportation, and other infrastructure shortages have already limited growth in several economies and could become more acute in localities where industrial growth continues to outrun infrastructure investment, broadly in China and in major urban centers such as Bangkok, Manila, and Jakarta. Rapid urbanization concentrates and intensifies environmental problems, including pollution, water consumption, and diversion of land from agriculture, and accelerates the need for investment in utilities, health, and social services.¹³ Entrenched sources of resistance to market reforms in India and China show increased political muscle and influence on events; opponents of deregulation in Japan and Korea remain strong but are under growing pressure to relent. Slower growth in labor forces, especially after 2000, will create growing challenges to future expansion of industrial growth. This slower growth will be caused by an aging population in Japan and Hong Kong, by approaching limits on further growth of labor force participation rates and inter-sector transfers to manufacturing in Korea and Taiwan and later in the ANIEs, and by skill shortages, especially in Thailand and Malaysia.

Sustainability issues related to environment are winning some victories over unrestrained growth but face uphill battles. Examples are environmental concerns aimed at controlling expansion of energy production in China and India, and over-exploitation of forest and fishing resources throughout the region. Questions of resource adequacy also arise in the context of intensifying population pressures such as those on arable land in China.

13. A recent UN report concludes that Asia will have seven of the world's ten top megacities (those with over 10 million population) by 2015: Tokyo (28.7m), Bombay (27.4m), Shanghai (23.4m), Jakarta (21.1m), Karachi (20.6m), Beijing (19.4m), and Dhaka, Bangladesh (19.0m).

Critical uncertainties

In addition to the foregoing evident and predictable problem areas, less predictable factors—wild cards—also have the potential to influence the speed and character of regional economic growth. Examples are:

- Uncertainties about China's leadership transition and alternative growth scenarios
- Possible food and energy deficits, particularly in China
- North Korea's future
- Potential security conflicts with China (e.g., the South China Sea, missile testing and exports, nuclear testing and non-proliferation)
- Conflicted Indian politics; nationalistic aversion/resistance to foreign investments
- Potential conflicts over regional trade liberalization
- Asian nationalism and regionalism.

Alternative China growth scenarios

The greatest economic uncertainties about Asia's future revolve around China.¹⁴ It has not progressed nearly far enough to achieve the macroeconomic policy, legal, administrative, and regulatory structures and processes required to stabilize its growth path and in particular to assure consistent participation by foreign investors. It continues in an erratic and frequently disruptive pattern of boom and bust. The present boom has been more prolonged than earlier ones. Its consequences have not been as volcanic as those in 1988-89, but will corrode societal stability until inflation, corruption, and state enterprise deficits are brought under better control.

14. For a more detailed discussion of China's future, see CRM 95-226, *China and Security in the Asian Pacific Region Through 2010*, by Alfred D. Wilhelm, March 1996.

Uncertainties about future leadership further complicate evaluation of China's impact on the regional economy. Foreseeable alternative political-economic scenarios for China could produce moderately different economic outcomes for the region as a whole and may be useful to consider. Two basic scenarios suffice to illustrate the differences.

Scenario one: neo-conservative reform

Conservative members of the collective leadership under President Jiang Zemin that succeeds Deng Xiaoping are distressed by the adverse effects of aggressive growth and decentralization and by loss of Communist party authority and of central government revenues. Supported by the military, in an effort to consolidate power, they either co-opt, intimidate, or oust Vice Premier Zhu Rongji and other leading reformers. They blame too-rapid growth policies of reformers for having undermined popular trust in the party and government by causing high inflation, corruption, growth of huge migrant populations, social disintegration, and periodic popular unrest.

These leaders lay claim to protecting and preserving reform by correcting the excesses, reversing numerous reforms, and strengthening and expanding central control over prices and allocation of intermediate goods. They cancel plans to privatize state enterprises and to facilitate state enterprise bankruptcies. Instead they focus on enterprise reform. They launch a major campaign against corruption in the provinces, using it as a means to replace reformers and to reestablish Beijing's authority over independent-minded provincial officials. They blame excessive reliance on foreign investment for contributing to corruption, inflation, and popular discontent; sharply limit approvals of further foreign investments in manufacturing; and impose much tougher conditions on foreign investments in infrastructure. They also slow down implementation of infrastructure projects to dampen inflationary pressures.

Conservative leaders also pursue more nationalist positions on issues that affect China within the region, particularly regarding Hong Kong reversion, relations with Taiwan, and the Spratlys. Growth slows to around 6 percent by 1996-97. China is more combative over trade and political frictions with the United States, Taiwan, and Vietnam. It

sharply reduces preferential treatment of foreign investors. Depending on how much retrenchment there is in foreign investment, China deflates regional expectations. By 2000 China ceases to be a strong engine of growth, becoming instead a slight drag, causing roughly a one-half percentage point decline, to 7 percent, from the expected average annual regional rate of 7.5 percent. (This lower growth scenario is probably the more stable and sustainable of the two, but would discourage foreign investment.) If the new conservatism leads to a more aggressive Chinese posture on trade issues, the Spratlys, and other border issues, or affects security and safety of the sea lanes, it could depress regional growth additionally by up to half a percentage point.

Scenario two: aggressive reform

Authority remains in the hands of the collective leadership nominally headed by President Jiang Zemin, with few changes from the current roster of top officials. Supported by a pro-reform military group, aggressive economic reform resumes, but without the zeal and creativity that Deng brought to the process. Zhu Rongji acquires added authority as the principal flag bearer of reform, but is still somewhat constrained by conservative colleagues. The economy goes through a significant slowdown in 1996-97 and retreats from the high watermark of reform achieved in 1992.

By 1998-99 China resumes higher growth rates, averaging 9 to 10 percent annually. After 2005, however, China faces growing food and energy shortages and increasing difficulties paying for these needs with current exports. Growth slows to around 8 percent. Even so, by 2010, China has become the world's largest economy, and its per capita income is comparable to that of Taiwan today. It has served as an engine of growth for the region throughout the period, boosting regional growth to 7.5 percent (by roughly one-half percentage point annually over the 7-percent average that it would otherwise have been). Tiers 1 through 4 of Asia's economies in 2010 account for roughly 40 percent of world GDP, 40 to 50 percent of global trade, and over 40 percent of population.

Conclusion

While intensive coalition-building is still in progress and the outcome is not yet foreseeable, the evidence to date seems to validate the neo-conservative reform scenario.¹⁵ Even so, it appears that current references to reform implementation are not just lip service but that reform is actually continuing on a number of fronts (bank reform, enterprise reform, and inflation control).

Regional food deficit¹⁶

China faces the prospect of possible major increases in food and industrial crop imports. Many variables are in play: population growth, income-growth-induced increases in consumption levels, erosion and loss of other arable land, declining water supplies, serious unresolved land tenure problems, regular floods and drought, very low recent investment in agriculture, and many other factors. A Chinese food deficit could become substantial enough to put considerable upward pressure on regional and even world food prices.¹⁷ China needs to make concentrated efforts to optimize its domestic agricultural output. Considerable low-cost, medium-term elasticity of supply exists both in China and in Asia generally, not least from reduction of loss and spoilage.

Beyond some basic level of increased agricultural investment, however, China may get better returns and efficiency from concentrating incremental investments on labor-intensive manufacturing and service exports, and importing incremental food requirements from more efficient producers in Asia, Australia, and North and South

15. See Nayan Chanda and Kari Huus, "China, The New Nationalism," *Far Eastern Economic Review*, November 9, 1995, 20-28.

16. For a broad, regional analysis of food resource and other transnational issues, see CRM 95-230, *Human Dimensions of Security*, by Judith Banister and Peter Johnson, March 1996.

17. On a year-to-year basis, swings in China's food production due to climate, floods, drought, and other natural causes already have a substantial impact on world food trade and prices. Shortages of corn and other grain caused by adverse conditions in 1994 are causing a major boost in U.S. food exports to China in 1995.

America. New bio-technologies may also greatly increase the efficiency of China's agricultural investments medium- to long-term. Any price increases that occur will also force downward adjustments in consumption. However, without vigorous and serious Chinese action, shortages cannot be prevented.

Moreover, even short-term volatility can be very disruptive. In 1995 a combination of severe storms, drought, floods, and other natural disasters sharply reduced output of rice, maize, and other crops not only in China (worst losses in many years), but also in North Korea (half its crops claimed lost), the Philippines, and other Southeast Asian producers. End October 1995 prices were sharply higher than a year before in rice (+33%), maize (52%), soybeans (21%), wheat (27%), and cotton (17%). Catastrophic forecasts (e.g., by Lester Brown of World-Watch Institute) can be dismissed because they fail to consider the most elemental market- and technology-adjustment mechanisms, but the prospects will remain disturbing and potentially hazardous to Asian economic health if serious remedial actions are not taken within this decade.

- In any event, marked increases in international agricultural commodity and energy trade appear inescapable and establish a basis for forecasts elsewhere in this paper for bulk-cargo traffic increases atypically large in relation to overall economic growth and trade volumes.

Regional energy deficit

No fortuitous solution appears on the horizon yet where China's energy requirements are concerned. If skepticism about production prospects in China's Tarim Basin and the Sakhalin Island area proves justified, China could face fast-growing oil imports. Coal, nuclear, and other alternative energy sources all involve special problems and limitations. The problem could be complicated by unanticipated breakdowns in China's already heavily overloaded rail system; coal, which now supplies about 80 percent of China's primary energy, already monopolizes roughly 70 percent of its carrying capacity.

China's failure to close on a number of major power projects involving potential major foreign investments puts the economy at least two years further behind the growth of energy demand. The Spratly

Islands, according to the best Western geological accounts, do not themselves contain significant hydrocarbon potential. Nearby seabed discoveries offshore from Vietnam have been significant but have not established exportable potential. Indonesia's natural gas reserve potential northeast of the Natuna Islands is reported to be very promising, but its profitability remains to be established. Several current Asian energy exporters with declining energy yields, increasing domestic demand, and narrowing exportable surpluses are also expected to become net energy importers before 2010.¹⁸

In a separate analysis, this author concludes that the Asian-12, particularly China and Japan, will be up to 80 to 95 percent dependent on the Middle East to meet their energy import requirements by 2010. Meanwhile, both Japanese Prime Minister Murayama and China's leaders have recently initiated unusual high-level missions to the Middle East for the express purpose of improving relations.¹⁹

South China Sea

There remains a risk that China might resume its military activism in and around the Spratlys. At present, China's actions may be restrained by concern for the damage a more aggressive posture might do by discouraging foreign capital and investment in China and by precipitating more unified Asian reactions to its maneuvers. However, because exploration in adjacent continental shelf areas surrounding the Spratlys has confirmed some favorable prospects for oil and gas recovery, the risks of future conflicts would mount if a combination of energy and foreign exchange shortages in China made its

18. See for example, "Asia outgrowing food, energy supply," *The Nikkei Weekly*, October 9, 1995, 20.

19. See, for example, William Dawkins and Graham Bowley, "Murayama sets out to boost ties with Mideast," *Financial Times*, September 13, 1995: "Mr. Murayama and 60 officials were last night due to arrive in Riyadh... on the first leg of an eight-day trip, which also includes Egypt, Syria, Israel and Jordan.... Saudi Arabia alone supplies more than a fifth of Japan's oil consumption, said government officials.... It is the biggest Japanese diplomatic initiative in the region, and the latest of several examples of how Japan is exploring a foreign policy independent of US interests."

situation critical. Although China can be quite inconsistent in its statements and agreements on one hand and its actions on the other (not least involving the Parcel Islands in the South China Sea), the government is currently engaged in a round of conciliatory bilateral discussions with other claimants of the Spratly Islands.²⁰

North Korea

In economic decline, North Korea casts a lengthening shadow over Northeast Asia. In addition to its periodically resurgent nuclear threat, its overall economic deterioration poses the potential for collapse of both its economy and its political system. If this were to happen suddenly, the burden that would quickly fall on the South Korean economy would cause a major reversal in its fortunes for at least a decade. By contrast, a much-to-be-desired gradual normalization of North-South economic relations should have quite an opposite impact; it could stretch out and possibly prevent the hardships of economic adjustment in the north by permitting the South to begin the integration process by investing gradually in export zones to take advantage of North Korea's low labor and other costs.

Indian nationalism

The economic nationalists of the Bharatiya Janata Party (BJP), leading opponents of the Congress Party of Prime Minister Narasimha Rao, have campaigned vigorously on populist issues, blaming economic reform and big foreign investors for various national economic hardships. Some observers believe, however, that even if the dominance of Congress declines further, opposition parties in practice will support continued gradual reform. Even so, the recent action of the BJP-led Maharashtra state government in cancelling a \$3 billion power project to be built by Enron Corporation of the United States bodes poorly for high and sustained foreign investment inflows and accelerated growth.

20. For more on the Spratly Islands dispute see CRM 95-212, *The Security Environment With SEA and Australia*, by M. Lyall Breckon, March 1996.

Trade liberalization and competition

Nineteen ninety-three was a watershed year in international trade liberalization. At the Seattle summit of APEC leaders, President Clinton called on APEC to play an active trade-liberalization role looking toward eventual free trade in the Asia-Pacific. The seven-year struggle to complete the Uruguay Round, involving many contentious issues but mainly delayed by disagreement between the United States and Europe, culminated in a strong Congressional endorsement in December 1993. The passage of NAFTA in late 1993 further enhanced the environment for trade liberalization.

A year later, at the APEC summit on November 15, 1994, Indonesia led the move to set target dates for implementation of an APEC free-trade area by 2020 for the less-developed economies and by 2010 for others. Asia-Pacific business leaders of the Pacific Economic Cooperation Council (PECC) called for earlier completion—by 2010. The 1995 APEC leaders' summit in Japan identified more specific measures and timing for their implementation.

What does all this mean for Asian economic growth and U.S.-Asian economic relations? Clearly, implementation is the key; however, the development of an active competition between Latin America and Asia to liberalize trade can only be favorable for U.S. trade interests. On balance the prospects for liberalization in the Western Hemisphere are better than they are in the APR. This conclusion rests on a combination of broad propositions:

- Several groupings of Latin American countries have already inaugurated subregional free trade area (FTA) plans.
- The consensus among U.S. trade officials is that more Latin American (LA) than Asian countries have liberalized their economies to the extent necessary for an FTA to be feasible.
- For most LA economies, the FTA appeal is the prospect of improved, possibly preferential, access to the huge U.S. and North American market.

- For most Asian economies, the open accessibility of the U.S. market has been vital to their growth, but lacks the excitement of much faster-growing markets in Asia.
- Asians can exploit fast-growing Asian markets without inviting counter-pressures to liberalize their own. Especially among tier-3 and -4 economies, fears are growing that extensive relocation of industry from Northeast Asia will bring to Southeast Asia the same U.S. pressures to liberalize that Japan, China, and Korea are experiencing.
- Many in the ASEAN-4 fear that they lag behind LA subregions in liberalization. For this reason, a prevailing belief is that ASEAN must first undertake the less-threatening liberalizations within the ASEAN Free Trade Area (AFTA) before pursuing them at the APEC level. That way they can build competitiveness, market power, and bargaining leverage before getting into broad regional negotiations.
- Three of the four largest economies have taken the lead in Western Hemisphere liberalization efforts; by contrast, in Asia the three largest, including the two engine, economies (Japan, China, and Korea) are heavily protected and are likely to be laggard and reluctant participants, as they have demonstrated in their the recent opposition to liberalization of agriculture.
- Growing Asian deficits in trade with Japan are frustrating many Asians and adding to their determination to find solutions.

Japan will not take a lead in regional trade liberalization but will mainly respond to ASEAN's lead. The two largest countries, China and India, having massive continental markets, are also susceptible to a natural tendency to exert the bargaining leverage their huge markets potentially afford them with foreign traders and investors. Officials of both China and India cannot help but be impressed also by the wave of foreign investor and supplier interest that flooded ashore in 1993-95 as they signalled the opening of infrastructure and other market opportunities to foreigners. Notwithstanding China's expressed interest in joining the World Trade Organization (WTO), it may not feel pressed to do much liberalization as long as it attracts an abundance of foreign capital to finance industrial and

infrastructure projects most needed for its development. Much the same could prove true for India.

Asian nationalism and regionalism

Asia's share of world trade has grown rapidly following the Plaza Accord in 1985, from 13 percent then to roughly 20 percent in 1994. Intra-Asian trade has increased to 34 percent of the region's global trade. Japan's trade with Asia exceeded its trade with the rest of the world in 1994. Asia's heightened appreciation of the importance of Asian markets is reflected in its responsiveness to opportunities in China, and in ASEAN plans to accelerate AFTA trade liberalization. Cumulatively, these and other developments have given Asian business and leaders an elevated sense of the region's distinctive importance and character. Asian pride in economic achievement was ratified by the World Bank's release of its report *East Asia Economic Miracle*. It has intensified Asian sensitivity to outside pressures if they are seen to conflict with Asia's interests. Leaders like Malaysia's Prime Minister Mahathir, who favors a regional economic grouping to exclude non-Asian countries—an East Asian Economic Caucus (EAEC)—have gained increased hearing. Keidanren, the leading Japanese business organization, has reportedly endorsed Mahathir's proposal. A sense of Asia's increased economic strength has given more Asians a corresponding sense of the possibilities for saying “no” to outside pressures.²¹

Thus, the possibility should not be discounted that some single trade issue, or group of issues, could trigger a special exclusive grouping, creating a precedent for further moves in that direction. This possibility argues for avoidance of too aggressive or imperious a style in U.S. economic policy toward the region. A memorandum from Assistant Secretary for Asian and Pacific Affairs Winston Lord reported in the press in early 1994 indicated his concern about the prevailing style of U.S. management of trade and other relations with East Asia.

21. Several recent articles have made this point. See Paul Blustein, “Just Say ‘No’ to Those Western Allies: A Strident Malaysian Nationalist Urges Japan to Tilt Toward Asia,” *The Washington Post*, December 11, 1994, C2.

Implications of critical uncertainties

The growth forecasts in the next section allow for continuation of boom-bust cycles in China's growth and the likelihood of growing Chinese imports of food and energy. However, if neo-conservative policies cause China to play a more assertive role toward its neighbors or foreign investors, if serious political or economic turmoil should take place in China, or if sustained military conflict involving any of the larger of the Asian-12 should break out, the result would certainly reduce prospective regional growth significantly below the predicted 7.5- to 8-percent level and create severe adjustment problems for the Asian economies and sectors most affected. Prospects for playing any of the other wild cards appear sufficiently remote or limited in impact that no adjustment has been in the present forecast.

Projections through 2010

Two additional economic variables need to be considered in detail before projecting Asia's growth rates through 2010: (1) differing population growth patterns, and (2) differences in national savings and investment rates and the extent to which investment requirements diverge from savings.

Population and savings

Table 1 highlights the sharp differences in population sizes and growth rates expected during the period. Most notably, the average population growth rate among the ANIEs is half that of the ASEAN-4. By contrast, in two less-developed EMIEs, Vietnam and India, population growth rates exceed the ASEAN-4 average, while China's strict population control policies make its rate the fourth lowest of Asian developing economies.

Economies with the highest average population growth rate in the region must absorb larger proportions of domestic savings to expand infrastructure and productive capacity faster than population growth if they are to continue raising per capita income. Their ability to do so in turn depends heavily on national savings rates. This challenge applies particularly to the Philippines, with the region's highest population growth rate at 2.05 percent, and to Vietnam, Malaysia, and India. Table 2 demonstrates the continuing savings strength of Asian economies in this respect. Currently, year-on-year changes have been minor, which indicates continued strength. The forecast in this study adjusts mainly for rates of population aging and changing consumption patterns. This forecast projects savings rate increases for some newly invigorated economies such as the Philippines and India, and only modest declines for most other regional economies. The reductions are based primarily on aging labor forces; otherwise, consistently high rates in the past decade support continuation of great underlying strength in the region's ability to finance its own rapid development.

Table 1. Asian-12 population projections, 1995-2030 (in thousands)

	1995	2010	2030	Average annual % chg. (1995- 2010)
Tier 1: Japan	125,213	127,946	122,154	0.14
Tier 2: ANIEs				
Hong Kong	5,926	6,248	6,276	0.31
South Korea	44,825	49,872	53,679	0.71
Singapore	2,943	3,524	3,971	1.21
Taiwan	21,137	23,571	25,860	0.73
Subtotal	74,867	83,215	89,786	0.71
Tier 3: ASEAN-4				
Indonesia	192,543	231,253	274,712	1.23
Malaysia	19,876	25,413	31,955	1.65
Philippines	69,209	93,774	121,448	2.05
Thailand	60,460	71,957	83,314	1.17
Subtotal-1	342,088	422,397	511,429	1.42
Plus Vietnam	74,109	97,059	123,210	1.81
Subtotal-2	416,197	519,456	634,639	1.48
Tier 4: EMIEs				
China	1,199,332	1,347,514	1,500,611	0.78
India	934,228	1,170,014	1,432,181	1.51
Subtotal	2,133,560	2,517,528	2,932,792	1.11
Total Asian-12	2,749,837	3,248,145	3,779,371	1.12
All Asia	3,218,701	3,888,236	4,635,372	
World total	5,692,210	6,944,433	8,474,017	
Asian-12 as % of all Asia	85.4	83.5	81.5	
Asian-12 as % of world	48.3	46.89	44.6	
Asia as % of world	56.5	56.0	54.7	
North Korea	23,927	29,137	34,784	1.32

Table 2. National savings rates (% of GDP)

	1975	1993	2010
Japan	32.8	27.5	22
Hong Kong	28.0	30.0	27
South Korea	18.5	34.5	32
Singapore	29.0	48.3	45
Taiwan	28.0	28.0	30
Indonesia	21.0	38.0	36
Malaysia	23.0	38.5	37
Philippines	27.0	14.6	24
Thailand	20.5	37.0	35
China	35.0	35.5	32
India	19.0	23.0	27
Pakistan	7.0	13.5	--
Sri Lanka	10.0	16.0	--

Economic growth rates

Table 3 provides this study's forecast of growth rates for the region, based on all the factors discussed above. A forecast for Mexico is included for comparative purposes. This table includes a range of expectations for China reflecting high and low alternative scenarios. In turn, because of China's heavy economic weight, a difference in outcomes for China will have a significant impact on growth of the region as a whole. The 1995-2010 figures are averages for the period.

For the Asian-11 (excluding Japan), the overall average with a high-growth China is close to 7.5 percent. This strongly favorable expectation is confirmed by other sources, such as the IMF. Its forecasts of comparative growth rates for the developed industrial world compare

Table 3. Recent annual growth rates and projections to 2010: the ASIAN-12

	1994	1995	1995-2010
Tier 1: Japan	1.1	2.7	<u>2.5</u>
Tier 2: ANIEs	7.1	6.9	<u>6.5</u>
Hong Kong	5.6	5.4	5.0
Singapore	9.2	8.0	7.5
South Korea	8.0	7.5	7.0
Taiwan	6.0	6.5	6.0
Tier 3: ASEAN	7.3	7.7	<u>8.0</u>
Malaysia	8.8	8.5	8.2
Thailand	8.3	8.5	8.0
Indonesia	6.8	7.0	7.3
Philippines	4.6	6.2	8.0
Tier 4	9.0	7.4	<u>6.5-7.5</u>
China	11.0	8.2	6.0-7.8
India	5.0	5.5	7.0
Vietnam	9.0	9.6	9.0
Mexico	2.6	3.5	<u>4.5</u>

Asia and Latin America between 1994 and an average for the period 1996-99:²²

Industrial nations	3.1%
Latin America	4.7
Asia	7.4

The World Bank projects growth for developing Asia at 7.7 percent for 1995-2004 but includes smaller, slower-growing economies (Myanmar, Laos, Cambodia, and Mongolia) and excludes Taiwan.²³

22. IMF "World Economic Outlook," May 1994, as reported in the *Far Eastern Economic Review*, November 24, 1994, 49.

23. *Global Economic Prospects and Developing Countries*, World Bank, Washington, DC, April 1995, 68.

It is clear from its growth advantages that Asia will greatly increase its share of global product over the forecast period, accounting for an estimated 37 percent of global product by 2010 (40 percent including India). It will constitute the largest regional market in the world, by far exceeding Europe and North America.

Further perspective is gained from the following projections:²⁴

	1995	2010	Yearly average growth rate
Gross global product (\$ trillions)	26	48	3.8%
World trade (\$ trillions)	4	16.6	9.3%

In this forecast, global trade is expected to grow 2.4 times as fast as global product. It will certainly exceed GDP growth in Asia, where high intraregional foreign investment levels have a strong export component. It seems very conservative to conclude that Asia's share of global trade will increase at least as much as its global product share. As further support, the World Bank report cited above, in its baseline report of February 1995, projects Asian exports of goods and services to grow at 9.5 percent annually through 2004. This estimate includes several small slow-growth countries excluded by this study and excludes larger and faster-growing Taiwan. In these circumstances, Asian trade growth, averaging in excess of 10 percent annually, seems entirely plausible and even conservative for the period to 2010, i.e., faster than the global average. For detailed analysis of individual economies and tiers, see appendix B.

World Bank projections for Asia (including India) indicate that by 2000, it will:

- Constitute 40 percent of world population
- Account for over half of 1995-2000 trade expansion

24. "Snapshot of the Next Century," *Business Week*, November 18, 1994, 194.

- Account for over half of 1995-2000 global domestic product growth.

Even allowing for repetitive boom-bust cycles and for a possible conservative reaction in China, Asia will certainly become the most powerful economic region in the world either by or shortly after the turn of the century. Because of its increasingly interactive economies, growing specialization of production, and high intraregional foreign investment flows, its trade power will constitute an even greater share of the global total than its income.

Transportation growth

Growth of at least 10 percent per annum in Asian trade will clearly be paralleled by growth in shipping in the region. Although bulk cargos have typically grown more slowly than low-unit-weight but high-value-added electronics and other advanced-technology products often shipped by air, there are reasons to believe that this may not be the case during much of the period examined in this study. One is that energy requirements grow faster than GDP, and energy shortages in China will probably grow faster still. In addition, the probable emergence of food shortages in China, Cambodia, and even Indonesia, combined with expanded food exports from Vietnam and other Southeast Asian economies, would also boost bulk trade growth more rapidly. Another factor is the continued rapid growth of Asian metal and mineral demand, and production, concentrated in Indonesia and Australia (see below). Even if volumes of tanker and bulk-cargo traffic grew no faster than overall trade, maritime traffic in East Asia between 1995 and 2010 would more than quadruple.²⁵

Because of projected faster growth for the ANIEs and ASEAN countries and for China and Vietnam, the growth of general maritime commerce will be heavily concentrated along an axis from Korea,

25. See *Maritime Economic Interests and the Sea Lines of Communication Through the South China Sea: The Value of Trade in Southeast Asia*, by John H. Noer with David Gregory, a CNA study to be published by NDU Press.

along the coast of China and Vietnam, through the South China Sea. We can expect growth to be concentrated mainly on:

- Oil traffic from Middle East sources through the Indian Ocean and intermediate straits to China, Japan, Korea, and Taiwan
- Coal, oil, and liquid natural gas (LNG) from Indonesia through the South China Sea to Japan and possibly southeast China
- Bulk cargo of minerals, coal, and food from Australia, Indonesia, and Vietnam northward to China and Japan
- General expansion of cars, production equipment, and heavy manufactures to and from China, Korea, the ASEAN-4, and Japan.

Containerized traffic should follow similar patterns. Indicative are data on the largest Asian container ports. In 1992 Hong Kong and Singapore each handled about twice as many containers, at roughly 8 million twenty-foot equivalent units (TEU), as Kaohsiung (Taiwan) and showed by far the largest percentage and absolute growth from the year before. Other ports reporting 1 million TEU or more were (largest first) Yokohama, Tokyo, Pusan, Kobe, Keelung (Taiwan), Bangkok, Nagoya, and Manila.

As the dimensions of this traffic growth become more clear, we should see increased investments to expand port capacity and to meet any shortages in tanker or cargo vessels. (Japan and Korea accounted for nearly 60 percent of new ship orders booked in 1994, which appear to represent nearly a one-third increase over 1993 in tonnages ordered.)

Because of Asia's probable increased dependence on Middle Eastern oil (especially if India becomes a major factor in trade with East Asia), the major point of concern would be traffic through the Straits of Malacca/Singapore and the Sunda and Lombok straits. With the former already subject to serious congestion, navigation hazards and safety problems, pressure on other straits is certain to increase. Australia, with about 60 percent of its exports passing through the

Indonesian archipelago on their way to East Asia, will also be very much concerned with the accessibility and safety of these sea lanes.²⁶

26. See CNA Occasional Paper 20, *Possible Threats to Shipping in Key Southeast Asian Sea Lanes*, by Henry J. Kenny, February 1996.

Another security concern is the growth of piracy from the southeast China coast through the Strait of Malacca. Recent reports indicate, but probably understate considerably, the dimensions of the problem.

Pirate attacks reported in 1994 (Int'l Maritime Bureau: FEER, April 20, 1995, 13) were as follows:

Indonesia-PNG	23	HK-Luzon-Hainan triangle	16
Malacca-Ind	10	S. China	6
E. China Sea	6	Philippines	5
Vietnam; Cambodia	4	Yellow Sea	1
Other	19		

U.S. economic relations with Asia

Trade and investment

Roughly 27 percent of U.S. manufacturing is located offshore, mostly in Europe, Canada, Mexico, and Latin America. U.S. direct investments in Asia have concentrated heavily in oil, natural gas, mineral, and forest resource development. U.S. reinvestment of earnings has been determined less by market growth than by opportunities to expand production of existing resources. Because of intensifying Asian energy and resource demand, we should expect U.S. investors to continue concentrating investments in these sectors as long as opportunities exist, particularly in Indonesia and Australia.

In addition, prospects are the best they have been for decades for strong growth of U.S. investments in Asian infrastructure and advanced-technology consumer goods. Further, reinvestment of profits from these enterprises to expand output should be very strong because of Asian market size and growth. Because the returns on U.S. investments in Asia, excluding China, should continue to be more favorable than in the United States and Europe, the expansion of U.S. production assets in Asia should, by 2010, become a much more important factor than it is presently, both in absolute value and relative to the rest of the world. In manufacturing, this should be particularly true in electronics and automotive sectors. For example, the United States has become the dominant foreign investor in Malaysia, establishing research and product development centers as well as manufacturing.

If analysts fail to note this phenomenon, and look only at U.S. trade and current account balances, they will greatly underestimate the importance of U.S. economic interests in Asia. These investments will be recorded as increased U.S. assets in Asia and their benefits will show up first as accumulated earnings retained abroad and as reinvested earnings in Asia. Only over a longer period as Asian growth

cools will we see growing repatriation of earnings. (Because new foreign investments in the United States have, in recent years, exceeded U.S. foreign investments, net earnings outflows from the United States to foreigners have been increasing. Rising U.S. investments in Asia could slow that growth.)

Balance of payments outlook

The competitive pressures increased by NAFTA and hemisphere trade liberalizations will stimulate the United States to strengthen its most competitive industries over the next ten to 15 years. Major U.S. multinationals have begun to remedy their past neglect of Asian opportunities. Prospects for expansion of U.S. exports in infrastructure industries such as power, telecommunications, and transportation should improve U.S. trade and service earnings shares in Asia. Inadequate funding for the U.S. Export-Import Bank and other U.S. trade finance resources are a serious limiting factor, however. The rising unit value of U.S. exports to Asia should also offset some of the growth in its trade deficit with the area.

Unfortunately, there is no way the United States can do more than slow the growth of its balance of payments deficits with Asia or at best reduce these combined deficits marginally. The hard truth is that Asia is sustaining and even increasing its ratio of national savings to GDP to around 35 percent—a level several times higher than that of the United States. Even those that do not fully invest those savings domestically are concentrating their investments in other Asian economies. Thus, the Asian-12 will continue to improve their competitiveness vis-a-vis the United States, moving into ever more technologically advanced goods and services. Over the next ten to 15 years, non-Japanese Asians will invest increasingly in the United States and should begin to experience greater interest and earning reflows. A significant part of these investments will aim to acquire access to U.S. technology, R and D, and markets.

The United States will inevitably experience a combination of (irregularly) increasing balance of trade and payments deficits with Asia along with a depreciating dollar. Japan will account for a declining

share of our regional trade and payments deficits, while the ANIEs and particularly the ASEAN-4 will produce a growing share.

What the United States can do is to build on its competitive gains of the past five years by making every effort to promote its exports and investments in Asian infrastructure and other emerging technology industries where U.S. industry has strong competitive advantages. In this way it can strengthen its most competitive industries by attracting U.S. and foreign investment into expanding those industries.

China's trade surplus with the United States will continue growing to rival Japan's but on a volatile path, determined in major part by how well China can sustain its attractions to foreign direct and portfolio investment, and in part by the course of Chinese trade negotiations with the United States and the WTO. Unlike the ANIEs and ASEAN, China cannot expect to sustain a global trade surplus within the next decade, because its capital requirements will far exceed domestic savings.

Exchange rate effects

The Japanese yen will continue to appreciate irregularly against the dollar over the entire period, periodically depreciating but overall rising, albeit at a slower rate than the 40-percent decline recorded between early 1994 and April 1995. The yen could end the period near a ¥60 per dollar average rate (a 25- to 30-percent gain) over the final five years, barring a radical change in U.S. fiscal policy.

Yen appreciation will continue to slow exports from Japan but will expand imports proportionately less as Japan continues to protect its industries and services supplying the domestic market. Japan's ability to earn dollars and other foreign currencies will remain strong. Despite a weak and slow-growing domestic economy, its exports from expanding production in Asian and other foreign economies, and its earnings from investing its portfolio surplus abroad, will grow to become a dominant source of its foreign exchange earnings. These foreign assets are projected to grow from less than \$100 billion in 1990 to over \$700 billion by 2000.

Two additional factors will add to these secular pressures on the yen-dollar exchange. To protect their dollar and Euro-currency investments against exchange risk, the Japanese have begun to transfer that risk to foreign investors by investments in Euro-yen instruments. In addition, particularly Asian countries, with their yen liabilities accumulating rapidly because of Japanese aid and investor financing, experience greatly inflated loan servicing charges as the yen appreciates. This results because most of their export earnings are denominated, and their foreign exchange reserves are held, in dollars. Their ability to repay in yen declines with the yen value of their dollars. Spurred by the sharp decline of the dollar since 1993, Asian countries, especially in ASEAN, are said to be holding an increased proportion of their foreign exchange reserves in yen assets, which reduces the demand for and value of the dollars.

If ever real interest rates in the United States were to rise while those in Japan were low or declining, these extra pressures for yen appreciation could be expected to reverse for a time. That prospect is dim for the near term. Because of highly restrained growth in the United States at the same time Japan is on a slow recovery path, U.S. and Japanese interest rates are more likely to move in parallel. The uncertainty of prospects in China, Japan's need for funds at home, and heightened risk aversion by Japanese insurance companies and other large investors all add to current pressures against the dollar.

China's currency can be expected to depreciate modestly against the dollar through 2010, for reasons noted above. Both ANIE and ASEAN-4 currencies should appreciate more slowly than the yen through 2000-2010. The Korean won depreciated through most of the 1980s. Extraordinary domestic investments—some aimed at major expansion of global market shares in electrical, electronic, and automotive sectors—exceeded domestic savings until recent years. That pattern seems likely to reverse as Korea now appears more intent on expanding investments in China, Europe, and other markets. Our best guess is that the won will fluctuate but on a gradually rising path, with the value appreciating more than 10 to 15 percent against the dollar by 2010.

By contrast, the New Taiwan dollar (NT\$) has held a fairly steady but slowing appreciating path over the past 15 years. With a puzzling but rather consistent surplus of national savings over investment, Taiwan seems to have become more of a capital exporter with higher prospects for future appreciation, as against the won. A best estimate is a 20- to 25-percent appreciation against the dollar through 2010. A similar rate of appreciation might be expected of the Singapore dollar as its policy is now strongly addressed toward expanding its entrepreneurship in the region.

Malaysian and Thai currencies, reflecting countries that have high national savings rates but remain significant capital importers, are less likely to appreciate than ANIE currencies. Still, they might be expected to fluctuate around a gradually appreciating trend toward the dollar after 2000 or 2005. Indonesian, Philippine, and Indian currencies are likely to remain somewhat soft throughout the period on a mildly depreciating trend vis-a-vis the dollar. This reflects these countries' ongoing reliance on foreign assistance and capital to finance both their infrastructure and major development plans and their accumulating foreign debt servicing burdens.

Asian technology prospects²⁷

Overview

The notion that low-cost labor is the main competitive challenge from Asia, still widely held in the United States, falls far from the mark. It fails to consider new Asian trends and dynamics with potentially far-reaching implications for U.S. economic, labor, business, and security interests.

The drive to move into ever higher value-added products will be the hallmark of East Asia's intensifying intraregional competition in the coming decades, affecting the strategies even of China and other emerging market industrial economies (EMIEs). Meeting urgent infrastructure needs will be a dominant channel for introduction of the most advanced technologies into lower-tier countries. A recent example is Burma's signature, in January 1995, of a contract for a cellular telephone system for Mandalay.

Thus, it is essential to understand more about the status and dynamics of technology in the Asia-Pacific Region. Achievements and prospects in technology within Asia follow basically the same pattern as economic development in general, showing greatest and most rapid development in the most advanced tiers. The following list is a rough

27. The two reports cited here provide extensive detail and substantiation for the analysis that follows: *Asia's New High-Tech Competitors*, Division of Science Resources Studies, National Science Foundation, Washington, DC, 1995 (NSF 95-309); "21ST CENTURY CAPITALISM: How nations and industries will compete in the emerging global economy," *Business Week*, Special Issue, November 1994.

hierarchy of stages of technology evolution, from most to least advanced:

- I. Basic research
- II. Applied technology developer; global leader
- III. Technology importer and developer; major exporter
- IV. Technology importer; joint venturer; fabricator; assembler; limited exports
- V. Importer/assembler: equipment, technology, kits (mainly for home market)
- VI. Importer of technology embodied in infrastructure and other products.

Japan basically fits category II; the ANIEs III; the ASEAN-4 and the EMIEs, a combination of IV, V, and VI.

Japan: Global leader in technology development

Japan's achievement of global leadership in the application, commercialization, and rapid advancement of technologies for consumer and producer products is well known. More important even than its achievements in electronics and automotive industries were those in manufacturing technology applicable to a broad array of sectors. It continues to depend heavily on foreign (U.S. and European) sources for basic research and technological breakthroughs. On the basis of foreign technology acquisitions, its predominant emphasis in research and development (R&D) spending is committed to applied research and, within this category, to product development leading to commercialization.

Much, and possibly most, of Japan's success in technology application follows a consistent pattern: application of acquired (in a few cases, self-originated) technology first to simple, mass-market products to establish a market and income flow, followed by application to progressively more complex and specialized products and uses. Another hallmark has been Japanese ingenuity in discerning the potentials for mass-market application of new or emerging technologies. Where

Japanese firms were unable to purchase or license technology directly from the United States or from European countries, they often acquired it by reverse engineering or purchased small technology development firms or built research labs in the United States and Europe, or, less often, developed new technologies themselves.

From here on, Japan faces increasingly agile and effective competition from the ANIEs. Several factors permit the ANIEs to close their technology-product gap with Japan with increasing rapidity:

- **Competition:** Technology has become much more widely available and easily transferable to these Asian competitors. Some European technology companies in particular are willing to transfer competitive technologies to the ANIEs outright, rather than attempt to compete directly with Japan in Asia. In turn, the ANIEs are being pushed hard by efforts of ASEAN countries (especially Malaysia) and China to develop more advanced-technology products.
- **National savings:** The ANIEs now have national savings rates higher than those in Japan, giving them added potential for acquiring Japanese and competing technologies and for closing the gap more quickly than before. Their lower salaries and wages give them a cost advantage as well.
- **Appreciation:** Strengthening of the yen vis-a-vis other Asian currencies has rather steadily improved the cost advantages of the ANIEs in applying new and emerging technologies.
- **Support:** The ANIEs' rapidly expanding infrastructure investments emphasize the latest technologies, often more modern than those that support Japan's industry, and include development of national laboratories and research centers able to attract top-quality returnees from the United States.
- **Failing systems:** The structural features that have made Japan a powerful competitor in the past show signs of undermining its abilities to maintain a technology lead, including weaknesses in the banking system, delays in improving infrastructure, and overregulation.

- **Market power:** Japan's market has matured and now tends to be dominated by replacement purchases and evolutionary change in quality. Markets such as China's and India's are so new, huge, and fast-growing that they more easily command transfers of technology and local production by foreign investors as the price of market admission, and they are not yet technologically threatening to investors.

Japan was able to maintain its lead in the past mainly by developing acquired technology, but it has become more and more difficult for it to build a lead over its smaller but agile and aggressive Asian competitors. Japanese economic leaders recognize that to maintain broad technology leadership will depend much more on Japan's ability to develop basic new technologies by putting more emphasis on basic and developmental research and comparatively less on applied research and by strategic alliances with foreign technology firms. Many see Japan's ability to make that shift effectively as facing serious handicaps:

- Its culture emphasizes group consensus and penalizes the kinds of individuality and creativity widely credited as U.S. strengths in technology development.
- Its research establishment is predominantly concentrated in the corporate world where disposition to emphasize applied research will remain powerful.
- It lacks the institutional structure, experience, and mentality for effective venture capital financing, which has been instrumental in launching emerging technologies in the United States, often as spin-offs from larger corporations.
- Its university and post-graduate programs are the Achilles heel of Japan's technology ambitions; its more farsighted leaders recognize that radical reforms are required in most fields to put Japan into effective contention with U.S. and European research and technology.

Japan does retain one powerful card, however—its offshore economy. In some markets, Japan continues to dominate offshore production in automobiles and a number of other key sectors in which the ANIEs

are gaining ground. For example, Japan is expected to account for 37 percent of total UK automobile production by 1998. It controls generally smaller market shares in most Asian countries, however.

Spread of technology

Two sectors—autos and trucks, and electronics—illustrate the ways that other economies in Asia are acquiring new technologies, then mastering and improving on them.

Automotive sector

The automotive sector is a particularly important benchmark industry with regard to the status and spread of technology in Asia. Japan has built a network of production capabilities around the ASEAN region in automotive production and in electronics (as illustrated in tables that follow). By maintaining this structure, it supports continuation of its research and design capabilities in Japan while moving the most cost-sensitive production offshore.

However, as demand within ANIE and particularly ASEAN markets began to explode in the late 1980s, Japan's dominance and technology advantages eroded. European and U.S. manufacturers have begun to capture some of the market by sharing more of their technology in joint ventures than do the Japanese, including Ford in Taiwan and GM in Korea. Assembly of kits from foreign joint venture partners is still extensive in plants in the ASEAN, but local content has come to account for a majority of product value in the ANIEs. By building on first Japanese and then other foreign automotive technology—first in assembly and production, and subsequently in parts and components—Korea in particular has developed substantial independent design and production technology of its own.

In some auto technologies, Japan has been unable to retain or even establish similar dominance. Trucks are an example. Table 4 shows a number of the joint ventures outside of Japan in which tie-ups with European firms predominate.

Table 4. Illustrative partnerships in truck ventures and technology arrangements

	Partners	Facility plans
Korea	Mercedes/German Motor Mfg	Provides engines and technology
Indonesia	Mercedes/German Motor Mfg	Produces 6-8 ton trucks
China ^a	Berliet-Yanan	Heavy 6-ton trucks
	Steyr	Truck (80% local content)
	Iveco Joint Venture	Component manufacturing, technology transfer (65% local content)
	Volvo ('94) with China Natl Heavy Truck Corp	Letter of intent
	Mercedes	Under negotiation
India ^b	Iveco/Ashok Leyland	Not available
	Mercedes/Telco	Not available
	Cummins/Telco	Produces diesel engines
Vietnam	Iveco	Negotiating

a. China's current bus requirements are estimated at 30,000/year.

b. Currently produces per year over 70,000 trucks and buses over 5-ton gross vehicle weight and over 140,000 lighter trucks.

Why so much cooperation between Asia and Europe, rather than Japan? The main attraction is that European companies are more willing to engage in full technology transfer than the Japanese commercial vehicle makers. Another reason is that Japanese domestic restrictions on heavy vehicles mean that European makers have more expertise to offer.²⁸

The prospect of major oil and natural gas developments in China, Indonesia, and Malaysia is reported to underlie the strength of European auto producer interest in these markets. *Financial Times*

28. "World Commercial Vehicles," *Financial Times*, December 16, 1994.

Management Report forecasts potential output by 2002 of some 2.8 million commercial vehicles in South Korea, Taiwan, Thailand, Malaysia, Indonesia, and the Philippines.

As Asian countries become world-scale automotive markets in their own right, their ability to command foreign technology has become visible and substantial. Market power even among the smaller Asian nations should not be underestimated. By 1992 Thailand was reported to be the largest market in the world for light trucks. Malaysia now produces one "national car" based on design and other technical assistance from Japan and is launching a second. China, with much more market leverage, is talking about launching its own small car. If the ASEAN Free Trade Association meets its goals for tariff liberalizations in the automotive sector and does not nullify them by erecting non-tariff barriers, the ASEAN regional market of 420 million consumers will become one of the fastest growing and largest in the world. Table 5 illustrates the importance of selected Asian countries as both markets for and producers of automobiles.

An ability to acquire and implement foreign technology, especially in joint ventures where foreign suppliers maintain control over its transfer, is a far cry from developing an independent national capability to exploit and develop new technologies. However, the ANIEs have demonstrated that, by concentrating on incremental improvements and extensions of acquired technologies, determined efforts, combining government support, and private initiatives can build national technology capabilities in relatively few years. This process is an integral part of building production capabilities. Korea is the prime example. With a population of 45 million, it now has ten automotive manufacturers, with high local content capabilities. Not only is it the seventh largest producer of automobiles with an output of 1.73 million vehicles in 1992, it has advanced to the stage where it is setting up to supply kits for CKD (completely knocked-down) assembly operations elsewhere in Asia. Hyundai, Kia, and Daewoo are now moving into production of luxury model vehicles. This is the same evolution-

ary process through which Japan achieved the world class status and leadership it enjoys in many applied technologies.

Table 5. Vehicle production and sales forecasts (thousands)

	Global				% change
	1994	1995	1996	% '96	1994-96
Production forecasts					
World	35,263	36,961	39,116	100.0	10.9
North America	7,827	7,961	8,106	20.7	3.6
Japan	8,873	8,987	9,222	23.6	3.9
Other Asia-Pacific	3,325	3,753	4,184	10.7	25.8
South Korea	1,751	1,909	2,652	5.3	51.5
China	369	487	6,463	1.7	1,651.5
Thailand	309	375	449	1.1	45.3
Sales forecasts and % change					
World	34,803	36,467	38,521	100.0	+10.7
Japan	4,297	4,459	4,617	12.0	+7.4
Other Asia-Pacific	3,390	3,753	4,534	10.5	+33.7
South Korea	1,016	1,098	1,118	2.9	+10.0
China	520	576	7,266	1.9	+1,297.3
Thailand	368	485	542	1.4	+47.3

Source: DRI World Automotive Forecast Report, August 1993, reported in *Financial Times*, "World Car Industry," Sept. 9, 1993, 2.

Nor are other Asian countries resting on the sidelines. For the period through 2000, automotive forecasts project that fastest production growth will occur in Taiwan, Thailand, the Philippines, and China. However, these projections have not taken account of Korea's determination to become the world's fifth largest producer by 2000 through its "X-5" project, which anticipates a need of \$36 billion of investment.

Electronics

Korea's ambition in the automotive sector should not be dismissed lightly; it simply imitates the country's great successes in electronics technology. Several Korean producers of DRAM (memory) chips, which began by applying Japanese technology 5 or 6 years ago,

concluded they had achieved world-class competitiveness capabilities and set out to expand production capability explicitly to capture a major share of the world market. Today Korea's Samsung is the world's largest producer of leading DRAMs, the 1- and 4-megabit chips. It has surpassed the leading producers in Japan and the United States and is the world's seventh largest producer of all kinds of semiconductors, with a 4.5-percent market share. Moreover, Samsung is now competing among the forerunners in efforts to claim the most advanced design for next-generation memory chips. It is the world's fastest-growing major semiconductor producer and continues to expand aggressively.²⁹ As a group, in all semiconductor categories, Korean firms (mainly Samsung, Hyundai, and Goldstar) now account for 28 percent of world DRAM production.

Also in the electronics sector, Taiwan and Singapore have come a long way from the 1970s when they began as low-wage, labor-intensive packaging, assembly, and testing centers for U.S. and Japanese semiconductor and computer manufacturers. These two economies have followed a different path than Korea and have mastered the technologies necessary to become world-class and even world-dominant producers of computer components and accessories such as motherboards, displays, keyboards, soundboards, and disk drives. Singapore has relied on foreign investors to introduce the technologies.

As these three ANIEs have progressed toward higher microelectronic technologies, they have turned to neighboring ASEAN countries for assembly, packaging, and other more labor-intensive stages of production. But nowhere does the pace of intraregional dynamics show up more quickly than in technology transfers in mass market parts and components. Malaysia and Thailand have moved rapidly up the value-added curve. In Thailand, for example, a leading firm, Alphatec Electronics, has announced plans to build a \$1 billion silicon-wafer

29. See "Samsung may set up \$1 billion memory chip plant in US," *Financial Times*, January 10, 1995, 21. Recently it announced plans to construct this plant in Virginia.

foundry to support its advances into a range of other component production technologies.³⁰

Electronics is another sector in which the United States and local producers are currently overtaking and passing Japanese producers. Compared with Japanese firms that part very reluctantly with their technology, greater U.S. technology sharing has enabled quicker technology advances and lower production costs by Singaporean and Malaysian partners of U.S. firms, and has facilitated location of American electronics research facilities in those countries.

Technology and production are not all flowing one way to Asia. Ironically, in a recent development, Intel has just announced plans to begin producing motherboards in its U.S. facilities, in a direct challenge to Taiwan, which today produces 80 percent of the PC motherboards sold globally.

Clearly, Asia's technology ambitions do not end with the ANIEs and China, as Malaysia demonstrates in electronics. Among the most conspicuous ASEAN technology undertakings is Indonesia's effort to become at least a regional factor in production of small commercial passenger and transport aircraft, drawing on Spanish and German technology. Table 6 illustrates the comparative strengths and status of Asian countries in selected specialties in just the transportation-related, microelectronics, and computer sectors.

30. For an excellent example of how this Thai firm has leveraged its position as a low-end supplier to acquire a wide range of more advanced technologies, see Gordon Fairclough, "Chip Magnet: Thailand is set to enter the silicon-wafer business," *Far Eastern Economic Review*, January 12, 1995, 72.

Table 6. Illustrative technology strengths (partial)^a

Japan:	Microelectronic components, civilian and defense (2+), X Manufacturing (2+), X Trucks (3) Aerospace (2) Shipbuilding (2+), X
Korea:	Shipbuilding (2+), X DRAMs (2+), X Automobiles (2-), X Trucks (4)
Taiwan:	Computers: Motherboards (2), X Computers: Notebooks (3), X Computers: Keyboards (3), X Computers: IBM clones (3), X Trucks (6)
Singapore:	Computer soundboards (3), X Computer disk drives (3), X
Malaysia:	Automobiles (3) Microelectronics: Packaging, assembling, chip production (2-3), X
Thailand:	Automobiles (4) Steel (3), X Microelectronics: Packaging, assembling, chip production (3)
Indonesia:	Automobiles (4) Aviation (4) Trucks (4), M, X Steel (3)
China:	Automobiles (4), M Trucks (4), M
India:	Steel (3) Automobiles (4), M Trucks (4), M
Vietnam:	Trucks (5)

a. Technology stages:

- (1) Basic research
- (2) Applied technology developer; global leader
- (3) Tech importer/developer; component producer; major exporter
- (4) Tech importer; joint venturer; fabricator; assembler; limited exports
- (5) Importer/assembler: Equipment, technology, kits
- (6) Aspirant producer

X Significant exporter

M Market power (on the table denotes countries with sufficient market power to be able to attract technologies from abroad by making that transfer a condition for access to its market.

Infrastructure technologies

Asia is expected to be the largest and fastest-growing market for most infrastructure technologies over the next decade and possibly two. Even ignoring Japan's estimated \$3 trillion in infrastructure requirements to 2000, the rest of Asia—preponderantly the Asian-12 minus Japan—will require an estimated \$1 trillion in infrastructure financing. Table 7 identifies the sectors and the economies accounting for the greatest requirements.

Table 7. Infrastructure—Developing economy requirements (1994-2000) by sector as a percentage of total requirements and by country as a percentage of total regional requirements:

<u>Sector</u>	<u>Percent</u>
Power	35
Transport	35
Telecommunications	15
Util. (water, sewage)	10
Other	5
<u>Economy</u>	
China	34
India	23
Indonesia	9
South Korea	9
Thailand	6
Malaysia	5
Taiwan	4
Other	10

Source: "Infrastructure and Development," *International Herald Tribune* Special Report, November 1994.

Five aspects of infrastructure development give Asia a unique momentum toward accelerated acquisition and development of technology capabilities:

- Asia has been fortunate in achieving accelerated development just at the time when advances in transportation, power, communications, information infrastructure technology, and

management and manufacturing flexibility and know-how have revolutionized the quality, capabilities, and transportability of these basic technologies.

- As the world's largest and fastest growing market for infrastructure, Asia stands to acquire a larger fixed base of the most modern technologies that, on average, will be much more modern than that almost anywhere else in the world.
- The massive size of Asian needs creates the market power capable of attracting production and even some design and development of these latest technologies to Asian shores. This will be especially true of China and India, even for the most capital-intensive technologies. But for the smaller more mobile technologies such as telephones and especially cellular phones, the production technologies are already being transferred to smaller Asian nations as well.
- Asian market size and growth in some cases give governments power to extract technology transfers from foreign firms in exchange for (privileged?) access to home markets; both China and India have used this market leverage to acquire technology transfer commitments in industries such as power generation and aviation.
- Recognizing that national government and foreign aid and loan resources cannot nearly implement their total infrastructure needs, Asian economies have gone further in enlisting foreign capital in build-own-transfer (BOT) projects than most other areas of the world, inviting project bidding that will evoke competition from the most advanced technology suppliers.

The last of these phenomena is the technological equivalent for Asia that post-World War II industrial recovery was for Japan. Both started from nearly negligible bases and leap-frogged development elsewhere in the world. These technologies should provide Asia with modern capabilities and cost advantages that will facilitate production of a wide range of competitive exports well after 2000.

Table 8 highlights the market power of key Asian nations with regard to telecommunication infrastructure. Much manufacturing of telephone equipment is done in the major markets, especially

because of the importance of getting customer input into the design and production process.

Table 8. Asian telecommunications growth: cellular telephone market

A. Fastest subscriber growth areas: Jan 92 to Jan 93 (1000)

	Subscribers	Percent increase
China	160	321
Taiwan	257	116
Indonesia	31	97
Thailand	257	67
Singapore	111	59
South Korea	271	56
Australia	559	54
Malaysia	207	53
Philippines	55	38
Hong Kong	233	29
Japan	1,615	29

Source: "Mobile Communications," *Financial Times*, p. XII, September 8, 1993.

B. Fastest growing international telecommunication carriers, 1986-90

1 Sprint	338	686
2 MCI	772	649
3 Com Auth Thailand	134	570
8 Teleglob Canada	565	153
9 China PIT	460	142
10 KDD (Japan)	764	139
12 Singapore Telecoms	186	88
15 AT&T	4,380	75
18 Korea Telecom	188	44

Source: "World Telecommunications," *Financial Times*, October 7, 1991, 23.

Technology competition

Asia's most aggressive economies are being forced to upgrade and expand rapidly their medium- and advanced-technology industries

under pressure of labor and skill shortages and growing Asian competition. As technology has become more easily transferable to low-wage economies, foreign and domestic investors have moved into more advanced production facilities in electronics and other fields in Southeast Asia and in competing ANIEs. This has in turn forced the ANIES to place even more emphasis on moving up the technology scale.

When extensive low- and medium-technology industries were relocated from Japan and the ANIEs to Southeast Asia and China, they had to compete directly with domestic industries, especially for skilled labor. In China, certain cities have been designated centers for specific advanced technologies. China follows a general policy of encouraging importation of the most advanced technologies. As an example, in November 1994, China and South Korea signed an agreement for a \$1.5 billion joint venture to produce a 100-passenger aircraft aiming at a 20-percent participation of western partners providing advanced technology.³¹ Although far from a reality, the agreement is a strong statement of aspiration, backed by the market power of one of the world's largest purchasers of aircraft. Indonesia, Malaysia, and Singapore each has its own effort under way in the aircraft industry.

Spurred by government and private initiatives and the pressure of competition from other economies (e.g., ASEAN and Chinese), Korea, Taiwan, and Singapore in particular are positioning themselves to challenge the United States and Japan directly in the application and production of some of their more advanced technologies.

They are understandably driven in their push up the technology scale because they are "sandwich economies," caught between (1) lower-cost Asian economies that have been successful in attracting foreign investments to expand in progressively more advanced industries, and (2) increased U.S. and Japanese reluctance to share or cooperate in new technologies for fear of spawning competitors in these aggressive economies.

31. John Burton, "China signs deal with S Korea to develop airliner," *Financial Times*, November 1, 1994, 6.

Labor and technology

In spite of its technology opportunities, most of Asia is bumping up against significant limits to the further absorption of advanced technologies—growing and acute shortages of skilled labor and technologically literate management. Reliance on foreign build-operate-transfer (BOT) and other importation of foreign technicians provides partial temporary relief to the barriers inhibiting further technology applications. For the near and longer term, however, almost all Asian countries face a critical need for training and education in engineering, science, mathematics, and related skills—and for building the regional and national institutions needed to provide such training and education. Thus, the elevation of education and training levels has become the new standard by which Asian economies aspire to narrow their technology lag and overtake regional leaders in technology industries.

Widespread shortages in several Asian economies are rapidly forcing up the compensation of skilled, semi-skilled, and even unskilled labor. A number of Asian countries have had to turn to skilled and semi-skilled labor from other Asian economies, such as India and the Philippines, and even from China.³²

Lack of professional and technical skills has begun to limit the potential for future growth. In Malaysia and Thailand, shortages of engineers and technicians pose an immediate threat to continued economic growth.³³ As economies approach the ceilings for expansion of labor force participation and for mass education and training, incremental productivity gains become more expensive.

32. India currently produces over 40,000 engineers annually from government-recognized universities and colleges. "Labor: Failing Grade," *Far Eastern Economic Review*, September 29, 1994, 68.

33. Ibid, 62. "Rapidly rising wages are eroding the competitiveness of labour-intensive industries." "Malaysian universities produce about 5,700 graduate engineers a year. Demand for new engineers, however, is now running at almost 10,000 a year. The situation is nearly the same in Thailand where the 6,000 engineering graduates last year fell many thousands short of satisfying the needs of industry." 63.

The concurrent result is likely to be even further acceleration of compensation levels for higher job qualifications.

Shortages are stimulating rapid and extensive efforts to upgrade domestic labor skills, especially in engineering, technical, and scientific fields. In Thailand and Malaysia, "leaders realize they will have to follow the example of the more industrialized East Asian economies—which have emphasized higher education and shifted to higher-value-added production—if they hope to sustain rapid growth."³⁴

Pressures are particularly intense in Thailand, Malaysia, Korea, Taiwan, Singapore, and Hong Kong. Large increases in government spending on education are planned in Thailand where it gets 20 percent of the budget, and in Malaysia, which is expanding the number of technical and polytechnic institutes. South Korea is concentrating on expanding output of students with advanced degrees.

Most Asian governments have invested heavily in elementary, secondary, and vocational school education, bringing about major improvements in the educational and skill levels of the work force. Especially in Korea and Thailand, but also elsewhere, the private sector is a major factor in supplementing government education investments by financing schooling from elementary through college levels, and by providing on-the-job training to meet skill needs directly.

Several such economies (e.g., Taiwan and Korea) have launched efforts to attract scientists and engineers with advanced U.S. degrees to return and lead expansion of their national technology efforts. Most Americans would be greatly surprised to discover how far the Asian-12 have progressed in advanced education, as table 9 illustrates.

As an illustration of Asian progress in education, table 10 provides a profile of Taiwan. There, 25 percent of high school students are in vocational education. The ratio of high school graduates enrolling in higher education has increased from a rather steady level of 45 percent through 1989-90 to 65 percent by 1993-94. Of those enrolled in higher education, 48 percent are studying engineering, math, or science; another 22 percent, business administration and commerce.

34. Ibid, 62.

Table 9. University, science, and engineering education in Asia, 1990

	Ages 20-24 in universities (percent)	Science/Engineering (percent of all Bachelor degrees)
United States	27	17
South Korea	38	31
Japan	30	27
Taiwan	28	36
Singapore	29	42
Indonesia	10	39
Malaysia	7	n/a
India	4	23
China	2	52

Table 10. Dimensions of Taiwan's human resource development, 1993-94

Population (millions)	21.1
Number in school (millions)	5.3
Percent in school	25.2
Number in secondary schools (millions)	2.1
Percent in vocational training	25.0
Percent who enroll in next higher level	
Elementary to jr. high school	99.5
Jr. high school to higher education	65.5
Number in higher education (thousands)	575.4
Percent enrolled in:	
Engineering	31.0
Sciences	11.0
Mathematics & computer science	6.0
Subtotal	48.0
Business Administration and Commerce	22.0
Total percent enrolled in business, engineering, and science	70.0

Source: Taiwan Statistical Data Book, 1994.

Environment, resource, and energy considerations

Environment

Asia's environment is being conspicuously stressed by both population growth and economic development. Population in the Asian-12 is expected to grow by an average of 1.12 percent yearly through 2010, the regional economy by roughly 7.5 percent, and industry by over 10 percent. The impact is particularly concentrated in urban areas where population growth averages at least 3 percent annually and where industrialization and infrastructure development is most intensive. This section looks at the main environmental stresses, at their probable impact, and at the Asian economies most severely affected by them.

Population growth and urbanization are sources of many of the pressures that lead to pollution, as well as to excessive exploitation of land, water, and marine resources. U.N. predictions are that by 2015 Asia will account for seven of the world's top ten megacities (i.e., those with populations exceeding 10 million), including Tokyo (28.7 million), Bombay (27.4), Shanghai (23.4), Jakarta (21.2), and Beijing (19.4).³⁵ Outside of urban areas, pressures are most dense in the northern and central coastal plains of China, Java, and in many areas of India. Such pressures often lead to even more environmental damage in more sparsely populated marginal areas, as in central and western reaches of China, from exploitation of marginal lands and consequent erosion. However, urbanization also creates the greatest

35. Eduardo Lachica, "U.N. Report Says Asia Will Contain 7 of World's Top 10 Megacities by 2015," *The Asian Wall Street Journal Weekly*, November 6, 1995, 2.

political pressures for responses to environmental problems because of identifiable health hazards associated with unsafe water and air.

Overview of environmental problems

Three of the major environmental challenges Asia faces are: air pollution, over-exploitation or abuse of natural resources (land, water, forest, and marine), and waste disposal. This study looks specifically at effects on the environment from population growth, urbanization, and industrialization.

Air pollution

Air pollution has become a serious health problem in at least a dozen major Asian metropolitan areas. Four Asian countries are already among the world's largest air polluters. As early as the last estimate, for 1990, the four accounted together for 20 percent of global CO₂ emissions—China (10.8%); Japan (4.9%); India (2.9%); and Korea (1.1%). Levels of acid rain and particulate contamination drifting over Japan from China's most densely populated coastal regions already concern Japanese officials. Heavy dependence of China and India on coal for their rapidly growing heating and power requirements assures that this source of air pollution will remain at the forefront of environmental challenges facing the region.

With Asia's future annual average growth rate projected at better than 7.5 percent, and industrialization at more than 10 percent, energy demand will certainly grow by at least 10 percent annually. China and others hope to expand hydroelectric, nuclear, LNG, and other energy sources and reduce dependence on coal. Even so, China projects an average 7-percent annual increase in coal consumption for energy through 2000. If roughly 75 percent of China's total energy continues to be produced from coal, sulfur dioxide emissions will increase by more than 10 million tons a year and, by 2010, will nearly triple the volume of pollutants that China emits compared with 1995. In that case, China's share of the global emission would rise close to 20 percent—the current level for all Asia combined. India, which is well behind China in per capita power generation, would probably add a comparable volume if economic reform continues. Consumption of coal for household heating produces a high share of particulate

matter emissions, yet conversion to alternative heat sources would now also depend preponderantly on coal.

China has limited efforts under way to reduce pollution, but has a long way to go. It is said currently to wash only 19 percent of its coal, much of which is extremely dirty, soft, sulfurous brown coal with 30 to 45 percent of impurities by weight. The World Bank and Japanese government are funding a wide range of projects aimed at improving energy efficiency, reducing coal-related pollution, and developing alternative energy sources. These alternatives include a coal-slurry pipeline, use of natural gas and methane sources, and a variety of coal cleaning and desulfurization projects.

Over-exploitation of resources

This issue is driven by many of the same forces that make it a problem comparable to, or even worse than, air pollution.

- **Water.** A recent World Bank study identifies water shortage as a leading problem facing developing countries. In Asia, agriculture accounts for some 70 percent of water use. Supply problems appear particularly acute in China. The heavily agricultural northeast is chronically short of water and experiences frequent droughts. Studies find extensive areas in the northeast experiencing water table declines of up to six feet a year. Long on the books is a plan for a long canal to carry water from the Yellow River to the northeast, to moderate floods downstream in the east, and to alleviate shortages to the north. Yet even now water diversion for irrigation along the upper reaches of the Yellow River at times reduces flows nearer the more populous coastal areas to a virtual trickle, severely reducing and even precluding downstream irrigation. By contrast, farther south, annual Yangtze River floods destroy crops, lives, and much arable land.

Most urban areas in Asia face seriously inadequate supplies and extensive pollution of water. The World Bank estimates that about 20 percent of the funding required for water projects is needed to expand and upgrade urban water supplies.

- **Land.** Population pressure on China's arable land has long been among the most intense on the globe. The combination of continued population growth (currently more than 1 percent yearly), loss and diversion of land from agriculture (0.4 percent yearly), along with declining productivity and increased costs threaten to add 1.5 to 2 percent more each year to China's food deficit. Rising per capita consumption of grains and protein induced by increasing income is likely to add even more. China's huge \$30+ billion Three Gorges hydroelectric project now under construction is expected to flood some 11,300 hectares, or roughly 0.11 percent of China's cultivated land, and to displace up to 1.4 million people. Officials claim that it will add thousands of hectares of irrigated land and reduce the cost in crops and lives lost to flooding, but no independent assessment of the probable net impact on land and crops is available.

Development of marginal lands has destroyed topsoil and caused extensive abandonment in China, Korea, and elsewhere. Urbanization, industrialization, and development projects will divert substantial land from agriculture to industry, real estate, and infrastructure (e.g., roads and airports).

- **Forests.** Excessive exploitation has caused heavy silting of rivers and dams throughout the region, erosion of vast quantities of topsoil, and destruction of much cultivable land. In Indonesia, silt accumulations reportedly add up to 6 inches each year to Sumatra's eastern coastline. Clear-cutting and slash-and-burn agriculture are particularly serious problems for China, the Philippines, Malaysia, and Indonesia. Earlier this year, Indonesia announced it would reduce timber output about 30 percent over the next five years as a step toward supporting sustainable development.
- **Marine resources** are in jeopardy from over-fishing in several parts of Asia. The United Nations Food & Agriculture Organization (FAO) reports that more than a third of the 200 ocean fisheries it monitors worldwide are depleted or over-fished. Fish are a key source of protein, particularly in Asia.

Waste disposal

Waste problems have destroyed both fisheries and the ecological balance in rivers throughout the region. Textile and chemical industries have been a primary industrial concentration in virtually every country in the region, and account for a high proportion of the toxic-waste problems created. A Malaysian survey found that 73 percent of 116 rivers surveyed were either biologically dead or dying. Malaysia has developed a substantial program for reducing sewage and toxic waste disposal, with implementation projects exceeding \$3 billion.

Attempts to reduce dependence on coal and imported energy resources by expansion of nuclear power are creating problems for nuclear waste disposal by Japan and North Korea, and will in future years cause problems for China and Indonesia.

Natural forces

Each year natural forces, mainly beyond man's ability to limit or control, affect Asian economic development. Monsoon flooding, droughts, earthquakes, and volcanic eruptions all have an appreciable impact in destroying or disrupting crops, industries, and services, and otherwise limiting output and productive activity. The impact of such forces varies from year to year but, on average, produces substantial and measurable effect and compels allocation and even diversion of development resources in attempts to contain the most severe losses. China annually is afflicted by a perverse combination of Yangtze and Hue Be (Yellow) River basin flooding in the southeast and drought in the agricultural northeast. In 1994 a combination of drought and floods reduced food output so extensively that it brought about food price increases that accounted for 70 percent of China's price inflation that year. Nineteen ninety-five brought floods of record proportions to China, and weather reduced crops substantially in North Korea, the Philippines, and elsewhere, increasing prices for major food crops by 20 to 50 percent over 1994 levels in key regional markets. Were a severe earthquake to strike Tokyo or the Kansai, the economic impact could affect Japan and some economic partners for years.

To date there is nothing to suggest that natural forces are trending toward either an increasing or decreasing influence, but these examples serve as a useful reminder of the extent to which natural forces can throw normal expectations off course. Over the longer term, however, one natural development could have a particularly dramatic impact on Asia. If global warming should cause ocean levels to rise, it would pose a major threat to hundreds of miles of densely populated and cultivated coastal plains in Java and Sumatra that are only slightly above sea level, as well as to some of the most populated and heavily cultivated lands in coastal China and Bangladesh.

Implications for future economic growth

Concerned authorities in virtually every one of the Asian-12 are giving increased attention to means of reducing or repairing environmental damage and its impending limitations on future growth. The Asian Development Bank (ADB) estimates current spending on electric power generation alone at \$200 billion annually; so the related environmental protection measures needed will be substantial merely to keep pace with production growth. ADB consultants estimate a minimum cost of \$13 billion annually through 2000 simply to prevent further degradation of the environment and quality of life in Asia.³⁶ Modest reversals and improvements would increase the annual bill to around \$70 billion. Of the lower figure, water and sanitation would claim the lion's share of \$7.8 billion, and population control \$3 billion. More ambitiously, main expenditures required to slow deterioration in some sectors and to make improvements in others would be:

- \$13.1 billion to increase the proportion of population provided safe water and sewage services
- \$9.0 billion to control industrial emissions in 50 percent of all new industrial facilities
- \$8.8 billion to equip 70 percent of all new vehicles with low-pollution technology

36. Paul Weatherly, *Financing Environmentally Sound Development*, Asian Development Bank, Manila, 1995.

- \$7.5 billion to employ low-pollution power-generation technology in half of all new electric power plants
- \$7.5 billion for accelerated population and education programs.

Table 11 summarizes these costs.

Table 11. Projected annual investments required in safe or low-polluting facilities and technologies (\$ billions)

	Low	High	Objective
Water	6.8	8.9	--
Sanitation	1.0	4.2	--
Electric power, low-polluting	n/a	7.5	50% of new plants
Transportation	n/a	8.8	70% of new vehicles
Industrial emissions	n/a	9.0	50% of new facilities
Forestry	--	1.7	Management plan for all closed forests
Population education	3.0	5.0	--
Education	<u>2.5</u>	<u>2.5</u>	Equal education for females
Subtotal	13.3	47.6	
Other	2.2	22.4	

Note: China and India would require three-fourths of the \$13 billion low-end programs and two-thirds of the \$70 billion annual accelerated environmental programs.

Geographic concentration of environmental impact

Asia accounts for five of the world's seven most polluted cities—Shenyang (Liaoning province), Beijing, New Delhi, Calcutta, and Shanghai, with Jakarta, Bangkok, Hong Kong, Manila, and Taipei not far behind, in that order. Automotive traffic, fossil fuel for heating and energy, and industry are principal air pollution sources. Unfortunately, all three are growing at greater rates than population—at least 7 to 10 percent or more annually. In urban areas the number of vehicles is growing much faster than urban population, probably in excess of 10 percent annually. Several Asian municipalities have finally

begun modest measures to control automotive emissions. Because of the great diversity of impact from industry to industry, sources of information on the extent and growth of industrial pollution are difficult to obtain.

In China, beyond a certain level of particulate contamination, the adverse health impact of air pollution becomes statistically evident in afflicted populations. In northeast China and many major Asian metropolitan areas, air pollution has become a substantial health threat. Much of the area surrounding Beijing and extending north and eastward to China's border with North Korea registers particulate levels 5 to 10 times that beyond which health hazards become widely apparent in the population. Adding to industrial and vehicular pollution is the impact of seasonal dust storms blowing in from Inner Mongolia that pollute the air and heavily silt the Yellow River. Beijing is reputedly the respiratory ailment capital of the world. Energy-related pollution is another matter. The 70 percent of China's energy now generated by thermal plants fired by coal is expected to continue into the next century in spite of everything China can do to develop alternative energy sources.

Resource supply, demand, and development

Asia's dramatic growth is clearly reflected in the global market for resources, on both the demand and supply side.

The impact was exceptionally great during the 1985-92 period of hypergrowth stimulated by doubling of the yen's value and appreciation of other ANIE currencies. During this period the demand of the 11 leading Asian economies (including China and India, but excluding Hong Kong) grew an average of 5 percent a year for primary aluminum, refined copper and zinc, and crude steel, and three times that rate for processed gold. This pace so far outstripped growth in demand from other regions that the Asian-11³⁷ expanded their share of total global consumption by a third, from about a quarter of global consumption in 1985 to roughly a third of global demand by 1992

37. The Asian-12 minus Hong Kong, which is not a major player in most resource markets.

(somewhat higher in crude steel). Tables 12, 13, and 14 summarize this picture.

Table 12. Asian demand for selected metals

Asian demand for	% increase	% of world use		% change in world share
	1985-1992	1985	1992	
Primary aluminum (1000 MT)	49.3	20.7	27.2	+31.4
Refined copper (1000 MT)	46.1	25.1	33.5	+33.5
Refined zinc (1000 MT)	38.0	25.2	33.7	+33.7
Crude steel (mln MT)	35.8	25.6	36.3	+41.8
Fabricated gold (MT)	145.4	33.6	43.8	+30.4

Leading Asian consumers accounted for fairly consistent shares of this metals group across the board by 1992—Japan with between 10 and 15 percent, China 6 to 12 percent, South Korea 2 to 4 percent, and Taiwan and Australia between 1 and 3 percent. Five ASEAN countries together —Indonesia, Malaysia, the Philippines, Thailand, and Singapore—accounted for between 2 and 3 percent of global demand in all categories except gold (8.2 percent).

Table 13. National shares of Asian demand for selected metals in 1992

	Primary aluminum	Refined copper	Refined zinc	Crude steel	Fabricated gold
Japan	11.5	14.0	12.1	11.7	11.3
China	6.5	8.0	8.3	11.8	5.8
India	2.2	1.2	2.2	2.7	9.8
Taiwan	1.4	3.8	2.0	3.0	5.2
South Korea	2.1	3.3	4.1	3.2	2.3
Australia	1.6	1.1	1.8	0.7	0.6
ASEAN	1.9	2.1	3.2	3.3	8.2
Total	27.2	33.5	33.7	36.3	43.8

Asia runs a deficit in all of these metals except zinc and iron ore, but typically produces a relatively high percentage of its requirements in processed product, choosing to import ores and to process them at home or elsewhere in Asia. The dimension of these imbalances is indicated by the following figures:

Commodity	Asian % of global demand	Asian % of global supply
Aluminum	27	18
Copper metal	34	21
Refined zinc	34	54
Crude steel	36	38
Gold	43	25

In ten other minerals, however, Asia supplies over half the world supply, and in another dozen it supplies between 33 and 50 percent of the total world supply (1993 data):

Table 14. Asian supply of selected minerals

Commodity	Percent	Leading sources	Commodity	Percent	Leading sources
Tungsten	74	China, North Korea	Rutile	44	Australia, India
Ilmenite	73	Australia, India	Iron ore	43	China, Australia, India
Tin, metal	73	China, Malaysia	Pig iron	43	China, Japan, South Korea
Fluorspar	67	China, Mongolia	Magnesite	37	North Korea, China, India
Graphite	67	China, South Korea	Iodine	36	Japan
Barite	62	China, Philippines	Alumina	38	Australia, China, India
Tin ore	62	China, Indonesia	Steel	38	Japan, China, South Korea
Zinc, refined	54	China, Japan, Australia	Lead ore	35	Australia, China, North Korea
Manganese ore	54	China, Australia, India	Zinc ore	35	Australia, China, North Korea
Cement	51	China, Australia, Japan	Nickel ore	34	New Caledonia, Indonesia, Australia
			Nickel metal	33	Australia, Japan, Indonesia
			Lead metal	33	China, Australia, Japan

On the broad assumption that Asian demand for most minerals is likely to run close to 35 percent of global demand, Asia currently produces nearly all, or more than, its requirements in roughly two dozen minerals. Aluminum, copper, and gold are the primary exceptions. A single massive project now under development in Indonesia, the Freeport-MacMoran Grasberg mine in Irian Jaya, West Irian (Indonesia, New Guinea) may well remedy an appreciable part of the deficit in copper and gold.

Looking ahead, it would be unreasonable to assume that the Asian-11 would continue to increase their share of global demand at the same rate over the next 15 years. The 1985-1992 period was one of exceptionally high growth because of the effect of yen and other Asian currency appreciation in tripling foreign investment in the ANIEs and ASEAN. Moreover, toward the end of this period, the ANIEs began the transition involving relative decline in manufacturing as a share of GDP, with service sector contributions by now exceeding manufacturing.

It is not at all unreasonable, however, to expect that Asian demand for the major metals will increase to at least 45 to 50 percent of global demand by 2010, and probably closer to the high end considering that Asia's two giants are still in relatively early stages of industrialization. Because new commercial supplies of minerals tend to be found in locations more and more remote from the sources of demand, Asia's rapidly expanding demand for minerals (probably a 4-percent annual growth rate through 2010) is one of the main reasons to expect exceptionally rapid growth in bulk maritime cargos. When one adds the energy sector to this equation, the expansion potential becomes clearer. For example, in spite of indications that China may become an increasing net importer of energy (oil and LNG), officially China's plans call for coal exports of 25 million tons by 1995 and 30 million by 2000.

Energy prospects³⁸

Oil and natural gas

Regarding China's energy prospects, data indicate that in its present stage of development (rapid early industrialization) China would normally experience an energy consumption growth rate exceeding that of GDP. However, reportedly it has held energy growth to merely 50 percent of GDP growth. How has it succeeded in doing so when virtually all other industrializing countries have experienced energy growth at least 1.2 times GDP growth? Part of the answer may lie in limiting public access to electric power as an alternative to current primitive heating and energy sources.

China meets its primary energy requirements from its abundant domestic coal and is likely to sustain this pattern in spite of efforts to develop alternative sources. Even so, China has had to become a net oil importer in 1994, and will require progressively larger oil imports for at least the next two decades. Even after considering numerous potential energy supply sources within China and East Asia, evidence from multiple sources indicates a strong probability that:

- By 2010 China's total oil demand will very substantially exceed that of Japan, and 40 percent of these needs will have to be imported.
- China's dependence on imported hydrocarbons (oil, natural gas, and natural gas liquids) will grow in spite of major expansion of China's coal production and prospective development of new domestic oil (inland and offshore), nuclear, hydroelectric, and other alternative sources.
- By 2010 ANIE oil demand will equal three-fourths of Japan's, virtually all imported.
- By 2010 ASEAN oil demand will equal Japan's and come predominantly from import sources.

38. In general, reference here to oil is meant to include natural gas (liquefied) and other transportable hydrocarbons.

- Oil imports for China and ASEAN will grow much more rapidly than GDP, because, instead of a very small residual source, imports will become an increasingly important means of meeting demand.
- Estimates for China's oil imports range from rough equivalence with Japan's present imports up to 2 or 3 times as high by 2010.
- Dependence on oil imported from outside the region will increase from roughly 50 percent presently to at least 70 percent by 2010. (Some estimates run as high as 85 to 90 percent.)
- The Middle East is certain to be the preponderant source of these extra-regional imports.

Major variables that will affect the size of China's impact on world oil markets include:

- Changes in the ratio of growth rates of energy demand and GDP. From the current 0.5, this ratio could reach as high as 1.25—the more typical rate for an economy in China's stage of development.
- Improvements in China's energy efficiency, currently very low by industrializing nation standards.
- Improved prospects for development of domestic or regional energy resources (unfortunately evidence to date gives little basis for high hopes).

Japan, dependent on imports for 90 percent of its primary energy, is acutely sensitive to its future energy security. It increasingly perceives China as a major potential source of risk to its own economic future, because if shortages of energy within China should:

- Restrict China's economic growth, that would impact negatively on Asia's overall economic prospects.
- Raise global oil import demand relative to supply, that would increase upward pressure on per-barrel prices as well.
- Intensify China's efforts to obtain preferential access and terms from oil sources, which would affect Japan more adversely than almost any other country because of Japan's high dependence on energy imports.

On the other hand, Japan understandably fears that unconstrained Chinese coal use will aggravate the drift of acid rain and other pollutants from China into Japanese airspace, undermining agricultural productivity, health, and buildings. With its massive market and resource requirements, China may also command unique advantages in getting commitments of oil supplies from the Middle East. Japan's Green Aid program links Japan's energy interests with China's in extensive long-term ways, involving several billions of dollars of projects to help China improve its energy efficiency and domestic supplies while also experimenting with numerous ways of reducing their adverse environmental impact.

South Korea also depends almost completely on imported energy sources. Its recent activities could be indicative of what may become an increasing pattern in Asian energy matters. Mobil Oil revealed in 1995 that Korea Gas Corporation has signed a 25-year contract to buy 4 million tons of LNG yearly from a Mobil/Qatar joint venture in the Persian Gulf. As a result, this Ras Laffan project, potentially Mobil's biggest ever is a "go." Mobil and Qatar can arrange financing, tankers, and construction. This project in Qatar will be larger than Mobil's crown jewel and biggest money-maker, the Arun field in Indonesia. A related Mobil joint venture with the Wing Group is to operate three power plants in China using Mobil's natural gas from this same project.³⁹

39. Daniel Southerland, "Prudent Approach Pays Off Overseas: Mobil Credits Teamwork, Technology and Luck," *Washington Business (Washington Post)*, June 19, 1995, 13.

Findings, conclusions, and recommendations

Economic dynamics and prospects

The biggest challenge posed by Asia's economies for the United States between now and 2010 will be to adjust its thinking and policies to a world in which Asia accounts for over a third of global product and at least 45 percent of global trade, and increasingly dominates and shapes international markets, technology development, economic systems, institutions, and policies, with sharply decreasing deference to U.S. interests and concerns.

The ability of U.S. leaders to recognize, let alone acknowledge and act on, that prospect and its already visible implications is seriously impeded by multiple factors. These include distance and isolation from Asia (especially the paucity of Asia-Pacific organizational ties as compared to Europe), increasing U.S. preoccupation with domestic issues, aggressive unilateral assertion of U.S. trade and market access interests, eclipse of bipartisanship in foreign policy, severe reductions in federal budgets and functions relating to conduct of foreign relations, near-termination of U.S. economic assistance to Asia, growing congressional indifference to objective, nonpartisan assessments of foreign realities, and a growing tendency among politicians toward macho unilateralism in foreign affairs. These impediments place an increased burden of education and engagement on institutions with important responsibilities in the world beyond U.S. borders, including the U.S. Navy.

At a time when fostering cooperative, understanding relationships with Asia's emerging economic and market superpowers would seem indisputably to be in our best national interest, the immediate prospects do not appear bright. With growing Asian nationalism vis-a-vis the United States and the European Union, there is increased potential for Asian recourse to exclusively Asian forums such as the East Asian Economic Group (EAEG) proposed by Malaysia, should a

consensus develop that relations with the United States and Europe have become too contentious. On the brighter side, the creation of the World Trade Organization, APEC, and ARF provides alternative forums for cooperation with Asia, as well as a basis for Asian resistance to American unilateralism.

If, in the coming decade, the United States views growing U.S. trade and payments deficits as our foremost priorities in Asia, and concludes that Asia is basically a problem, not an opportunity, it is likely to concentrate on enforcing tougher unilateral policies toward Asia to force open its markets and to compel balance in its trade with the United States. Our interests will suffer and our influence will decline. If, on the other hand, the United States acknowledges that overall U.S. trade and balance of payments problems result from our inability to match Asians and others in national savings and investments, and that Asia's high share of our deficit stems from its uniquely high savings, different and more effective policies may be pursued. For instance, failure to ensure more success for our high-technology exports results from insufficient emphasis on equalizing global competition in government-supported trade promotion and finance—and the need either to match the efforts of our competitors to beat them out for the business or to force them to curtail excessive promotion.

The study forecast suggests that the United States will face continued growing trade deficits with Asia, and somewhat smaller balance of payments deficits as U.S. service exports remain strong. For that reason we can expect continued depreciation of the dollar with correspondingly increased costs of establishment in Japan, three ANIEs (Korea, Taiwan, and Singapore), selected ASEAN locations (certainly Malaysia), and possibly for some periods with regimented currencies like China's.

Technology

Challenges

Asia poses many technological challenges. Intraregional competition from Singapore, Malaysia, Vietnam, and other ASEAN and less-developed countries will increase pressures on the more advanced

economies (Japan, Korea, Taiwan) to stay ahead by (1) putting more resources into applied research and development in emerging technologies; (2) acquiring more Western technology through licensing, company acquisitions, repatriation of skilled nationals, imitation, reverse engineering, and so on; (3) seeking strategic alliances, joint ventures, and research cooperation with U.S. and other Western technology companies; and (4) seeking to attract component, subsystem, and even full system production industries away from Japan, the United States and Western Europe and to compete in an expanding range of medium- and even advanced-technology industries.

U.S.-Asian science and technology relationships will be subject to conflicting trends, and it is unclear what the net impact will be in the long term. Asia will increasingly challenge U.S. capabilities in advanced and new product and service technology industries. We should expect Asian human resource investments and quality to continue to advance, progressively catching up with U.S. skill and technology levels.

The United States faces a considerable challenge from the expansion and enhancement of Asian labor quality. Asia's growing demand for skilled and technical personnel is affecting the U.S. labor market directly by attracting ethnic Asian scientists and engineers to repatriate from the United States to Asia. Taiwan is a conspicuous example. It is already attracting an estimated 3,000 Chinese scientists and engineers a year to leave jobs in the United States to work in Taiwan.

To the extent that Asians now constitute a significant percentage (roughly a third) of those receiving advanced U.S. degrees in science, engineering, mathematics, and related fields, their increasing return to Asia will reduce the supply of advanced skills available to meet the needs of the U.S. economy, which cannot currently be met by U.S. citizens at present low levels of interest and entry in these fields.⁴⁰

40. Of 25,000 U.S. Ph.D.'s awarded in science and engineering in 1993, 13,000 were awarded to foreign students; 8,000, or 32 percent of the total, went to Asian students. (Source: National Research Council report, October 1994.)

U.S. service sector export surpluses with Asia will erode, however, as advanced service technologies are often easily transferable or exportable via telecommunications, and are generally more labor-intensive than manufacturing. In the face of this challenge, exceptional U.S. competitive and trade promotion efforts will be required to sustain technology and advanced-technology services such as information processing and software development within the United States.

Opportunities

Asian technology advances also present opportunities for the United States. Asia's preoccupation with technology has clearly created extraordinary opportunities for U.S. business and labor to meet Asia's massive infrastructure needs. We should study particularly the extent to which the technological reformation of Asia develops new opportunities for U.S.-Asian strategic technology alliances, and for U.S. supply of even more advanced technical systems, subsystems, and components. Asia can offer new opportunities for the United States if we recognize the challenge and prepare for the opportunities created by:

- Developing strategic alliances for research and for licensing and marketing of new technologies and new systems, subsystems, and components to new Asian technology markets.
- Responding to the challenge by committing greatly expanded resources to elevating the U.S. labor force education and skills from the industrial age to the technology age.

Prospects

The United States can expect soon to see intensifying and expanding Asian capabilities in advanced technology industries. We will find the skill levels of our labor force increasingly challenged and selectively surpassed by the skill enhancements proceeding in the Asian labor force. U.S.-Asian science and technology education relationships will be subject to several highly contradictory trends; it is unclear what the net impact will be in the longer term. For example:

- Asian universities and other high-level training institutions may advance to the extent that fewer Asians attend U.S. universities that depend on foreign students to sustain programs and to maintain teaching staff.
- A higher percentage of Asian students may return home, creating shortages of qualified engineers and scientists in the United States and increasing the need to import temporary professionals to meet U.S. shortages.
- A large proportion of technology jobs may be transferred abroad through new multimedia and computer technology, reducing the need for U.S. science and engineering (S&E) jobs.
- Rapid growth of advanced technology industries in Asia may provide expanded opportunities for cooperative relations, stimulating growth of science, engineering, and mathematics opportunities in the United States at more advanced levels.

These four possibilities probably do not exhaust the list of contradictory trends; because the speed of change in technology is so rapid, trends in this field will require close monitoring to avoid unanticipated consequences for future U.S. technology interests.

There can be a significant adverse impact on the U.S. economy if the U.S. response is too slow or inadequate. Asian technology trends will erode our technology, trade, and employment prospects if we do not respond constructively. Asian production will begin to displace U.S. exports in Asian markets, and imports of technology components and products into the United States will grow. Also, we may experience a significant reversal of the Asian brain drain as ethnic Asian Ph.D.'s return to Asia from U.S. colleges, universities, and technology companies.

Defense implications

One defense expert has estimated that roughly 70 percent of the value of new weapon systems on average goes for electronic systems, subsystems, and components. Because of the advent of a new era of dual-use technologies and even more because of tight or declining

defense budgets, defense establishments and suppliers are relying more and more extensively on technologies designed and produced for the civilian economy. Nowhere will the size, growth, and diversity of products and markets be a greater stimulus for the advancement of civilian electronic (essentially dual-use) technologies than in Asia.

Adding further to its importance as a future source of technologies applicable to defense uses is that, in contrast to most or possibly all other areas, Asia is the region where arms budgets are growing. Because of its rapid economic growth, much of Asia can afford to expand arms budgets up to 7 to 8 percent per year without even increasing the share of GDP going to defense.

Another dilemma for the United States is that the massive opportunities to supply Asian infrastructure needs include demand for technologies that will clearly strengthen not only the region's development but also its defense-relevant technology capabilities. This is particularly apparent in the telecommunication, information, aviation, aerospace, nuclear, and materials technologies.

Ironically, China and India are the two nations having the greatest power to leverage their huge markets in order to extract technology in exchange for market access or participation in major sectors of their fast-growing economies. Because both countries are actually nuclear powers and both have been suspect at varying times of having power-projection aspirations, their leverage is worrisome not only for its potential in obtaining technology, but also for giving them the ability to develop these technologies for military purposes and for economic alliance-building through onward transfers to unfriendly powers.

Combining this latter consideration with the prospect that, along with Japan, China and possibly India as well may find it essential to court all possible Middle East sources to assure long-term supplies of hydrocarbons, the destabilizing potential for China's use of its enormous market leverage in infrastructure and other sectors should be a source of continuing concern and close scrutiny.

The flip side of these concerns is that Asia has the potential to be an excellent low-cost supplier and developer of dual-use technologies. If

the need to stretch declining budgets by seeking out emerging foreign suppliers comes to outweigh constraints on offshore procurement, the opportunity to acquire non-critical components and subsystems from foreign developers in these emerging technology countries will grow. Given the strengths of Asian suppliers in micro-electronics, there should be a wide and widening range of technologies and products with dual-use potential obtainable from reliable and high-quality suppliers in Asia. At a minimum, there is every advantage to taking Asia seriously as an emerging source of advanced technologies, and to maintaining and expanding U.S. capabilities for monitoring Asian technology advances in dual-use sectors—at both applied and basic levels.

Environment, energy, and resources

The following are among the major conclusions flowing from probable developments in Asia's energy and resource environment over the coming decade and a half:

- Japan and China will progressively be more preoccupied, individually and jointly, with their future energy security and costs, and particularly with assuring themselves, either cooperatively or competitively, of stable long-term Middle East supplies and political relationships.
- Chinese awareness of this problem will be sharpened by persistent Japanese studies and alarms with regard to China's energy future, especially as China's energy demand and production pollutes Japan's airspace and environment.
- China will likely require major hydrocarbon imports from the Middle East, and 80 to 90 percent of all Asian oil/LNG requirements will have to be imported from the Middle East by 2010.
- Because of their OPEC membership (Indonesia, Malaysia) and Islamic populations, several Southeast Asian nations already have a strong Middle East component in their foreign policies.
- Japan and China will both increasingly court Middle East suppliers with purchase offers, aid (Japan), investments and joint ventures (Japan, Korea, and China), and military sales (China).

- Depending on the course of Middle East politics, growing differences regarding U.S. foreign policy could arise with China and even with Japan and several ASEAN nations over Middle East policy as 2010 approaches—especially if energy considerations drive them to develop policies toward the Middle East that are in conflict with those of the United States.
- If the United States ignores this energy challenge and fails to contribute to its possible near-term reduction or resolution, this Middle East axis could emerge as Asia's pivotal extra-regional foreign policy orientation.

This energy/Middle East preoccupation could pose the most serious long-term challenge for the future of U.S. relations with East Asia.

Maritime implications

From a combination of the resource, agricultural, and energy developments projected by this study over the period through 2010, one can foresee:

- At least a tripling and more likely a quadrupling of tanker traffic between Northeast and Southeast Asia, with much of the growth extending to the Indian Ocean and intervening straits.
- Intensifying interest in developing alternative sea and land routes.
- Revived interest in the Isthmus of Kra, including cost/benefit studies of pipeline, rail, and canal projects to bypass Strait of Malacca congestion.

It seems highly probable that remedial action will not be taken before congestion, accidents, traffic delays, increased insurance premiums, and other problems begin to increase the cost of maritime shipping considerably by about 2000. Energy and food shortages are likely not only to contribute to maritime congestion but to put direct upward pressure on prices in global markets. The combination could well bring about substantial inflationary pressures beyond the ability of individual governments in the region to control.

The farther one looks beyond 2000, the more likely that China will share with Japan an acute concern over the adequacy, safety, and economy of sea lanes through the South China Sea (SCS) and the straits beyond. For the next few years, China's dependence on these lanes will be relatively less, because the great majority of its exports head for the United States.

Trends in maritime traffic could favor increased regional acceptance of a U.S. security role. As Asian nations become more than ever dependent on the safety and security of sea lanes, and China, Japan, Korea, and Taiwan have particular reasons for concern, all should see U.S. presence as constructive and beneficial.

Meanwhile, however, the incentives for China to maximize its own oil resources could lead to intensification of Chinese incursions in the South China Sea. Competition among contenders in the race to succeed Deng Xiaoping by wooing China's conservative, nationalistic military leaders could also add to the incentives for a more aggressive posture there. (This may be a declining problem.) China's opportunity to consolidate claims to this area with limited costs to its maritime commerce will diminish as its oil and food imports grow. This possibility becomes even stronger if its leaders are persuaded that the United States is engaging in a policy of containment toward China. There are other dangers—to finance its growing food and energy deficits, China might be increasingly tempted to export missiles and other proscribed military and nuclear hardware and technologies, thereby undermining U.S. efforts in arms limitation and nuclear non-proliferation.

The challenges facing Asia in overcoming limits to its growth from problems with its environment, food, and energy supplies offer important opportunities for the United States to respond to and even lead regional efforts to confront these problems. For example, in agriculture, the United States is probably in the best position of any power to cooperate profitably with Asia given its many advantages in agricultural production, management, and biotechnologies.

Policy recommendations

General

The broader policy-related findings of this paper emerge from prospects that continued rapid growth in Asia may well confront major energy and food resource problems that will become apparent by 2000 and could be serious by 2005. Because it is hard to assign accurate probabilities to these outcomes, the policies recommended are cautionary:

- Beyond recognizing the challenges posed for future Asian growth and security by impending problems of environment, water supply, energy, and food, the United States should initiate and lead or strongly support greater regional efforts to address these problems with anticipatory preventive measures; coordinating and/or cooperating closely with Japan, it should take a visible and active lead role in APEC.
- U.S. policy goals should be to encourage and help Asia to minimize increased dependence on imported and Middle Eastern oil and to optimize its opportunities to engage constructively with China and others of the Asian-12 in meeting its prospective food shortfalls through technical assistance and exports from the United States.

U.S. objectives in pursuing these goals should be to:

- Engage itself constructively as a concerned partner working with Japan, APEC, and China in addressing Asian energy, food, and environmental challenges.
- Empower APEC working groups with the resources necessary to conduct effective studies and projections.
- Identify and act on ways in which the United States can play a leading role in contributing to moderating and resolving these problems through provision or sharing of technology and positioning the United States to supply Asia's residual needs, especially for food.

- If events confirm trends supporting this forecast, reevaluate its policy restricting export of Alaskan oil to Asia.

Cooperative engagement in Asia's energy and food issues should be a priority fully equivalent to trade policy objectives.

Conversely, the United States should avoid policies or statements that could reinforce Chinese concerns about possible U.S. or even APEC policies designed to contain China. Much the wiser course is to develop a long-term strategy toward the Asian-12 in general and toward China and Japan in particular. This policy would:

- Internally recognize the likelihood that market-oriented Asia, within 20 years, will become a dominant force in the international marketplace, technology applications, and leadership of international institutions such as the World Bank, IMF, and United Nations.
- Implicitly recognize the probability that the United States could face significant foreign policy differences with major Asian interests in the Middle East that will become apparent soon after 2000 and will continue for the indefinite future.
- Develop a broad strategy toward Asia that greatly elevates U.S. efforts to become engaged in Asia's sustainable growth agenda by promoting cooperation to anticipate and alleviate its energy, food, and environmental challenges.

To protect its political, economic, and security interests in Asia, the United States should develop measures to maintain its regional economic presence and influence through (1) greater support for U.S. exports and investments in Asia, (2) greater recognition and involvement in energy, food, and environmental challenges facing Asia, and (3) further opportunities to develop and apply its technological advantages to these three areas. The United States should also concentrate on its commercial and technological strengths to accelerate the development of high-tech markets in Asia and to downgrade and virtually eliminate the abrasive and broadly resented unilateral approach to market access, democratization, and human rights that has alienated most of Asia in ways that the United States can no longer afford. We also need to reinforce regional institutions by

shifting to active leadership in multilateral Asian organizations and seeking to develop a truly Pacific consensus on these issues.⁴¹

Because of China's size and the influence its emergence as a major regional power will have on the future of Asia, the economic dimension of U.S.-China relations will have broad effects on the region. A policy of engaging China as a means of encouraging it to play a responsible role in accordance with international norms should include extensive efforts, in cooperation with Japan, to assist China in dealing effectively with its water, food, energy, and other challenges.

Taken together, these policy changes would achieve a better balanced approach to Asia, one with less risk of alienating and polarizing Asia in an Asian-only anti-U.S. posture strongly given to conflicts in international energy interests.

Regarding the technology challenge from Asia, there are potentially great cost and technology advantages to the United States from promoting design, development, and supply relationships with Asian technology centers. The record indicates that the prospects for mounting effective U.S. efforts are dim, however. The extra expense of monitoring and the preference of program managers for working within established networks are but some of the obstacles. Still, the tremendous future importance of Asia seems to more than justify the effort required.

On the other hand, the expanding array of prominent U.S. firms, including defense contractors, involved in infrastructure, technology licensing, joint ventures, research laboratories, and other relationships with emerging technology users and developers in Asia provides a potential network for identifying leading prospects for technology cooperation in Asia.

41. The merits of such an approach, and the hazards of the present contrary course, are well expressed in Kenneth Lieberthal's article, "A New China Strategy," in the November/December 1995 issue of *Foreign Affairs*, pp. 35-49.

U.S. Navy-related

The consequences of 15 years of sustained high Asian growth are likely to affect the U.S. Navy more heavily than other services. Much of the impact will evolve around the congestion in maritime transport, the expansion of navies in key Asian countries, and rising costs of forward positioning as Asian currencies appreciate. With these considerations in mind, we recommend that the Navy:

- Support the foregoing general policy recommendations as a vital underpinning for sustaining U.S. influence and involvement in the region.
- Work for greater recognition of, and focus on, Asian realities and opportunities in U.S. policy formulation.
- Monitor Asian regional economic developments closely for an understanding of the effects of trade, investment, and technology patterns on security. (This might involve economic modeling with an emphasis on intra-Asian direct and portfolio investment flows, savings and investment rates, and technology developments. In particular, it should include emerging patterns and composition of sea trade with emphasis on changing patterns, and rates of change, of trade in agricultural and other bulk commodities, oil, and LNG.)
- Conduct a periodic assessment of the adequacy, safety, and security of Asian straits and sea lanes. If the findings raise serious concerns, take the lead in coordinating with naval and maritime officials of key Asian littoral powers to explore the possibility of multilateral actions through the ASEAN Regional Forum or the Western Pacific Naval Symposium, a biennial meeting of regional navy leaders.
- Show constructive interest in facilitating and protecting peaceful commerce in Asia by offering to help solve problems, e.g., suggesting or providing navigational and other shipping safety aids, and port and harbor development. The U.S. Coast Guard and the Maritime Administration should be involved.
- Broaden existing programs for monitoring electronics, communications, information, transportation, and other technol-

ogy developments in Asian countries in and outside Japan, particularly in Korea, Taiwan, Singapore, and India, and consider sponsoring select research and development projects that may have applications relevant to defense, naval, navigation, safety, environmental, or other problems of potential collaborative value.

- Use available studies to identify U.S. firms with R&D facilities in East Asia and explore the possibilities of co-locating small DOD monitoring or research capabilities where its own program management personnel could develop on-site familiarity technology sources and developments in Asia.
- Explore the possibility of expanding the scope of the Asian Technology Information Program (ATIP), based in Tokyo and funded in part by the U.S. Government, to serve the technology monitoring, identification, and development objectives of the Navy throughout Asia.

Appendix A: The evolution of Asian economic integration

This appendix presents an expanded discussion of the phases of Asian economic integration since WWII, concentrating on the dynamic interaction between groups of economies that is unique to Asia and explains much of its economic "miracle."

Phase I: Tiers 1 and 2 with tier 3—Resource complementarities⁴²

East Asia has become progressively more active in exploiting the benefits of its extraordinary economic complementarities over time. The process began in the 1950s with Japan's rapid industrial transformation. Japan almost completely lacked, but urgently needed, energy, feed stocks, and raw materials as it expanded from labor-intensive light industries such as garments, textiles, footwear, plastic products, and toys into intermediate, process, and heavy industries such as steel, construction, oil refining, chemicals, mechanical and electric machinery, shipbuilding, and automotive industries. Some of the most advantageous resources were available in Southeast Asia. Although Japan could purchase many supplies in world commodity markets on competitive terms, its ambitious government-led industrialization plans saw greater advantage in long-term purchase contracts and particularly in investments to develop larger, more favorable new sources closer to home. Through large and well-funded trading

42. As discussed in the main text, Japan is alone in tier 1, the four ANIEs (Republic of Korea, Taiwan, Hong Kong, and Singapore) constitute tier 2, the ASEAN-4 (Thailand, Malaysia, Indonesia, and the Philippines) make up tier 3, the three EMIEs (China, India, and Vietnam) are in tier 4, and the Russian Far East, Mongolia, Myanmar, Cambodia, and Laos compose tier 5.

companies (*soga sosha*), the major Japanese industrial families (*keiretsu*), such as Mitsubishi, Mitsui, and Sumitomo, were each able to develop their own sources of energy, feed stock, minerals, metals, timber, and other forest and tropical materials. Japan made particularly heavy investments in Australia and Indonesia. It invested as well in Malaysia, the Philippines, Thailand, and Vietnam. It invested in oil, coal, natural gas, timber and plywood, bauxite, iron ore, steel, and some refining facilities, supplementing these supplies with purchases from Australian, U.S., and other investment projects in the region.

By the mid to late 1970s, Korea and Taiwan, comparably as bereft of energy, industrial, and tropical materials as Japan, also became heavily dependent on Southeast Asian and Australian sources of raw materials and energy supplies, as they also began their move into process and heavy industries, including refining, construction, plastics, textile materials and other chemicals, shipbuilding, and steel.

Thus, foreign direct investment and project equipment for construction and processing flowed from Northeast to Southeast Asia, in return for rich reverse flows of energy and natural resources. These were the main early ingredients in exploiting resource complementarities that dominated intraregional trade between tiers 1 and 2 with tier 3, especially in these early decades.

Phase II: Tier 1 with tier 2—Cost-push industry relocation, implemented by foreign direct investment

Resources

Southeast Asia's and Australia's rich energy, forest, and other natural resources will continue to be an important aspect of complementarity serving the region well past 2010. The relative importance of this trend will diminish, however, except from Australia. In producer countries, the growth of domestic demand and the investments in increased processing domestically before re-exporting are consuming a growing share of producer output in some minerals. Particularly in oil and natural gas from contemporary Asian energy sources such as Indonesia, new production is failing to replace declining

output from existing wells. Economic reform and recovery in the Philippines enhance its prospects of becoming an alternative source of supply for some minerals.

Labor

In any event, the most valuable and meaningful complementarities among East Asian countries are those of production factor costs that stem from the more abundant unemployed or underemployed supplies of labor and land in the lower-tier economies. These go much further than energy/resource complementarities in explaining the changing patterns in intraregional flows, first in trade, since the 1970s and especially since 1985 in foreign direct investment, and now increasingly in technology, travel, and migration. As with energy and natural resources, the process of exploiting these complementarities began with Japan. Already in the 1950s, rebuilding an entirely new industrial complex with the most modern foreign equipment, Japanese industry experienced tremendous productivity gains. Its rising wages attracted labor from agriculture. As it expanded toward more capital-intensive industry, productivity gains resulted in double-digit wage increases over most of the decade. Rapid urbanization increased property and rental costs swiftly, particularly because agricultural land even in urban areas could not be switched to other uses.

Consequently, Japan began to experience erosion of its competitiveness in labor-intensive light industries such as those producing garments, textiles, toys, plastic products, small electric appliances, and other light consumer goods. U.S. quotas on Japanese textiles and other goods increased its incentive to invest in higher-unit-value products. About that time, the United States began pressing Japan to reduce its tariff and other barriers protecting domestic industries. As Japan's aggressive industrialization began to produce substantial trade surpluses by the late 1960s, it came under increasing pressure to appreciate its currency. Yen appreciation, from Y360 per dollar in 1965 to Y300 in 1969, further eroded price competitiveness in lower-end products.

As labor-intensive industries became unable to compete, Japan had a luxury of choice. Because Japan's national savings rate had reached

exceptionally high levels in the mid 1960s, it had sufficient low-cost capital that it could invest not only in more capital-intensive industries at home, but also in relocating its declining, competitively marginal industries to lower-cost locations. In this way it could also supply intermediate materials, component parts, and equipment to its labor-intensive subsidiaries offshore.

In considering sites for relocating marginalized production, Japan found great natural advantages in tier-2 East Asian economies. The four ANIEs were bent on rapid industrialization and had comparative advantages in the types of labor-intensive industries Japanese industry was seeking to relocate, particularly abundant low-cost labor. Taiwan and Korea had the particular advantages of proximity, larger populations, and more abundant land. With roughly 35 years under Japanese rule, both were well known to Japanese, familiar with Japanese practices and language, and had relatively well developed infrastructure and economic development policies. Although they lacked the energy and natural resources required, Japan was well equipped to arrange those supplies. Where there was political resistance to re-entry of Japanese investment, its firms arranged to supply equipment, materials, and initial management in return for long-term supply contracts. They found less resistance in Hong Kong and Singapore, which were more industrialized and had exceptionally valuable locations on main transportation routes, along with financial, trade, and other infrastructure advantages over Korea and Taiwan.

Meanwhile by the mid 1950s, tier-2 economies had their own determined economic development efforts under way. Korea and Taiwan began with agricultural development and import-substitution priorities in the 1950s and early 1960s. Governments intervened extensively to protect and promote industrial development, initially to supply domestic needs for basics—food, shelter, and clothing. Japan's successful development policies provided a general model for development. Hong Kong and Singapore followed more open-market policies, relying on their early entrepot advantages to identify labor-intensive industries in which they could be competitive. All four economies achieved exceptionally high savings and investment rates. Their industrial labor forces and per-worker capital investment levels grew rapidly. Japanese investments and purchase contracts gave a

further boost to growth rates, turned their attention to the potentials for export-led growth, and inspired local entrepreneurs to compete with offshore Japanese producers in light industry. High demand levels were spurred by U.S. force procurements for Vietnam in the late 1960s and early 1970s.

As industrialization and urbanization accelerated in Korea and Taiwan, pressure on land availability and costs increased. Property values in land-short Hong Kong and Singapore began to skyrocket by the late 1960s. These economies also began to experience the same high annual wage increases typical in Japan ten to 15 years earlier, and the speed of development quickly absorbed readily available supplies of surplus and underemployed labor. As Singapore saw both its labor and land facing almost total absorption by development trends, it decided in 1973 to break from its low-wage light-industry model. It literally decreed a major across-the-board wage increase and announced its intention to concentrate its foreign investment approvals and its education system on technology industries and other high-value-added sectors from which it could get the greatest value from its scarce land and labor. Because of heavy immigration from China, only Hong Kong was able to keep wages fairly low relative to the three other ANIEs, but steep land values eroded even its comparative advantages in light industry.

Phase III: Tiers 1 and 2 with tier 3—Continued and extended cost-push relocations

By the early 1970s, Japanese firms found that the cost advantages of relocating their land- and labor-intensive industries to the ANIEs were rapidly diminishing, and the growth of strong local enterprises was increasing resistance to Japanese investments, especially in Korea and Taiwan. They could consider the alternative of investing to produce in their main U.S. and European markets, but wage, land, and other costs there were too high to support competitive production in most labor-intensive light industries. As Japan was faced with relocating further light and medium industries offshore, it once again found that the most attractive and competitive sites, were in East Asia, in the somewhat more distant Southeast Asian countries of the ASEAN-4

(Indonesia, Thailand, Malaysia, and the Philippines). Japan began to add direct investments in light, assembly, and process industries to its previous concentration of natural resource investments in these countries. (Japan's investments in Australia still concentrate heavily in energy and other natural resources.)

This process continued and expanded as the 1970s progressed. In addition to expansion of production in textiles, garments, footwear, electric appliances, metal and plastic consumer goods, and other light industry, Japanese firms began also to invest in labor-intensive assembly, packaging, and component manufacture for higher value-added industries that by then had begun to experience cost-competitiveness erosion at home. The great majority of Japan's foreign direct investment (FDI) in tiers 2 and 3 in that period was directed at production for export to third markets. The offshore packaging, assembly, and testing of microelectronic components emerged in the early 1970s in not only Japanese but also U.S. investments in Southeast Asia.

Japan was also facing increased pressure to let its currency appreciate because of its large and growing balance of trade and payments surpluses. To lessen its foreign exchange accumulations and the pressures on its currency, Japan began to expand rapidly its foreign economic assistance program of grants and concessional loans to developing countries, initially on a basis that tied use of these funds closely to Japanese suppliers.

Gradually, the ANIEs were faced with the same dilemma Japan had confronted more than a decade before. While their capital costs were higher, all four economies had sustained extraordinarily high national savings and investment rates, ranging between 30 to almost 40 percent of Gross Domestic Product (GDP). They also were able to follow the advantageous two-lane road—investing both to relocate marginalized production to cheap locations and to shift investments at home to higher value-added production. Singapore led the parade as it found cost advantage in subcontracting out to nearby Malaysia the packaging and subassembly of microelectronic components,

while it concentrated on testing, fabrication, and manufacture of basic components.

Phase IV: A 1985 watershed—The Plaza Accord

A watershed economic event in 1985 greatly accelerated the cost-push relocation dynamic in East Asia and added new dimensions to the process. This was the meeting at New York's Plaza Hotel of the finance ministers of the G-5 or Group of Five members of the Organization for Economic Cooperation and Development (OECD).⁴³ They reached an agreement known as the Plaza Accord, announced September 22, 1985, which called for the members' cooperation in the substantial appreciation of the yen. This was their choice of policy instruments for dealing with the progressive growth of Japan's balance of payments surpluses. From a low of roughly Y240 per U.S. dollar somewhat earlier in 1985, the yen doubled in value to about Y120 over the succeeding two years.

This doubling of the yen put great pressure on the cost competitiveness of Japanese industry. Although it reduced the cost of Japan's energy and resource imports, it made it twice as expensive for foreigners to buy yen for yen-origin imports. Japan reacted with a complex of responses involving close cooperation between government and the private sector. A series of sector-specific government-industry councils met to consider what adjustments each sector of the economy would have to make in response to yen appreciation to different levels, looking even to a yen of 100 or less per U.S. dollar. Over the following period of about five years, from 1986-1990, Japanese industry attempted to restructure its economy to adjust to appreciation by (in rough order of magnitude):

- Making its largest investments domestically to increase manufacturing efficiency and to shift production into higher value-added and emerging technology industries.

43. The G-5 members include the United States, France, Germany, Japan, and the United Kingdom.

- Making its second largest investments in total magnitudes in its two largest markets, the United States and Europe, not only in distribution but increasingly in assembly and manufacture, even of products where it remained competitive in exports but feared erection of protectionist barriers.
- Expanding its investments in East Asia to roughly triple their level in the preceding five years (even though in absolute terms this was only a distant third in terms of total magnitudes). This investment was concentrated mainly in the ASEAN countries, but was also sizeable in the ANIEs.

These industry councils reportedly concluded that Japan would have to relocate offshore at least 10 percent of its manufacturing capacity to retain competitiveness and that this percentage might have to rise to 20 percent if the yen fell significantly below 100 per U.S. dollar. The Japanese government worked to facilitate the relocation process by keeping interest rates low and credit easy, by coordinating its aid for East Asian infrastructure projects to support Japanese industry relocation investments offshore, and by expanding foreign aid and credits, especially in Asia. It provided subsidized credits to ASEAN enterprises for engaging in joint ventures with Japanese firms. Japanese industries were able to finance offshore investments extensively using so-called equity bonds that permitted them to borrow massive quantities of medium-term funds at roughly a 1-percent interest rate, less than the rate of inflation. Such extensive availability of cheap money fueled a Japanese investment binge that appeared to produce many overpriced or unsound investments, especially in the United States, and ultimately much overcapacity.

Not just *Japanese* investments in ASEAN tripled. The Plaza Accord also brought about roughly a tripling of the combined FDI of the four ANIEs, who together actually exceeded Japanese direct investment flows in some ASEAN countries. Their FDI increases resulted from a combination of factors that stimulated them to accelerate their relocation of industries offshore. One was the additional export advantages created by the post-Plaza decline in Japanese competitiveness, causing them to experience trade surpluses and to come under pressure to appreciate their currencies also, but by less than the yen. A second factor, it appears, was the necessity and opportunity to

respond to and get the jump on Japanese efforts to retain competitiveness through ASEAN investments, by taking advantage of the same cost advantages. The impact on ASEAN of this multiplication of Asian investments was dramatic. Even though these investments added less than 15 percent to the gross domestic investment of the recipient countries, they accounted for from one- to two-thirds of their expansion in manufactured exports. They also added at least one percentage point to national growth rates, taking some into double digits during the latter part of the 1980s. They also pushed the rate of industrialization to new highs.

Overall, the Plaza Accord contributed to a quantum expansion of the role of foreign investment in international development after 1985 to roughly three times its importance relative to international trade levels, compared with pre-1985 levels. In East Asia, it produced virtual hypergrowth in Southeast Asia but greatly spurred growth in the ANIEs as well. Some four years after the Plaza Accord (by 1989-90), several important consequences were visible:

- A substantial share of the export surpluses with the United States that used to come from Japan began to come instead from the ASEAN countries and some ANIEs, as did some exports from ASEAN that used to come from the ANIEs.
- High rates of growth caused major shortages of infrastructure throughout the region, causing extensive power brown-outs, severe urban traffic congestion, along with long delays and increased costs in implementing investment projects, especially in ASEAN countries.
- Accelerated ASEAN growth rates caused severe skill shortages and threatened continuation of high rates.
- Gradually, labor and other costs of doing business in ASEAN countries escalated.
- Sustained high growth throughout the region greatly expanded the middle class, strengthened the buying power of most economies, and created a boom in demand for consumer goods, including a wide range of status and prestige goods.

The foreign investment boom in ASEAN in the late 1980s had several features worth note.

Regional markets. Both Japanese and offshore Chinese investments were much less directed at producing for markets in Europe and the United States than previously. A substantial part of production was directed at local and regional markets. In addition, Japanese investors in sectors such as automotive and electronics organized investments in production and assembly on a regional basis, picking locations according to the comparative cost and market advantages in each particular ASEAN country.

Coordination of Japanese aid and investment. Japan was by far the dominant national source of foreign aid to the ASEAN region. In general, Japan continued to rely on requests for aid, often planned and orchestrated with the host government by Japanese companies. In line with the urgency of restructuring to offshore locations after the Plaza Accord, Japan gave priority to support for industrial estates and other infrastructure that would facilitate its private investment for restructuring production to offshore sites.

Emergence of "greater Japan." ASEAN countries have been more open to Japanese investments than were its former colonies of Taiwan and Korea, permitting Japan to build a more extensive owned production base in Southeast Asia than in the northeast. The reinvestments by Japanese subsidiaries in the area have been substantial. However, they do not count in official Japanese statistics on foreign investment, which include only outflows from Japan. With the rapid expansion of Japan's ASEAN investments since 1985, its production facilities there constitute a significant part of the nearly 10 percent of its national production located offshore.

Shift of trade surpluses. Substantial exports that formerly went from Japan, and some from the ANIEs, are now exported from plants relocated to ASEAN export platforms. These account for the growing trade surpluses of ASEAN countries with the United States, and the roughly corresponding decline in the Japanese and ANIE surpluses that appear in the 1986-90 data. These shifts, while sufficient to activate some U.S. quota restrictions on ASEAN exports, were not great

enough to create a trade surplus crisis with the United States, as has developed with China recently.

Japanese dominance eclipses U.S. economic presence. The United States provides only limited economic aid to the region, primarily to Indonesia, while Japan's aid goes to all but Singapore and Brunei. U.S. direct investments are heavily concentrated in energy and resource developments, especially in Indonesia, along with another concentration in electronics and computer-related investments in Malaysia and Singapore. More limited U.S. investments are found in personal and household care products and pharmaceuticals. Overall, however, in manufacturing, Japan has emerged as by far the major force, followed by the combined ANIE investments mainly from Chinese sources. When combined with the influence exerted by its foreign aid, Japan is capable of exerting considerably more economic influence on ASEAN governments than is the U.S., especially since it is able to meet directly some of their most pressing infrastructure needs. Senior officials in both Malaysia and Singapore have expressed admiration for Japan as an economic role model for the region. While Japan may also be able to influence ASEAN views in security matters, the United States almost certainly will continue to exert the dominant influence in this arena. The United States may find it difficult, however, to outweigh Japanese influence on issues that combine economic and security interests.

Phase V: Three upper tiers with tier 4

China's economic reforms began in 1978-79 with the rehabilitation of Deng Xiaoping and his reform allies. Over the succeeding 12 years through 1991, the Chinese implemented many economic reforms with the same success characteristics that other Asian economies had achieved:

- Initial emphasis on agriculture: introduction of open markets, private plots, decontrol of prices.
- Progressive decontrol of other prices.

- Early introduction of laws and regulations designed to be congenial to and encourage foreign investment in offshore oil exploration and production.
- Creation along the coast of five special economic zones endowed with incentives for foreign direct investment in production for export; subsequently, Beijing allowed or tolerated extension of incentives by provincial authorities and foreign investment production for both domestic and export markets.
- Ambitious infrastructure plans to facilitate both domestic and foreign investments throughout China.
- Introduction of authorized stock markets in Guangdong, Shanghai, and authorizations for listing individually approved stocks in Hong Kong and New York.
- Initiation of ambitious plans for extensive reform of state enterprises.

As Chinese luck would have it, reforms were gaining real credibility with overseas Chinese and other Asian investors just as the attraction of investments in Southeast Asia was beginning to dim because of spreading brown-outs, gridlock, and other aggravating and costly infrastructure and skill shortages. Deng Xiaoping's famous trip to Guangdong province in January 1992 and his exhortation to the province to go forth and become one of the Asian tigers (NIEs) led to a gold-rush atmosphere.

But it is important to note four special features of Chinese reform that created a whole new dimension to the intensifying region-wide competition for foreign capital. First, by permitting foreign investors to serve the domestic market, China galvanized foreign investor interest in the prodigious potentials of a prospective market of 1.2 billion consumers. Second, by allowing, and effectively encouraging, competition among China's provinces and municipalities to attract foreign investors, Beijing raised the stakes in the competition for foreign capital to a new high that would force others to respond by liberalizing their terms. Third, and most important, both Beijing and certain coastal provinces in particular opened major infrastructure and public utilities projects for bids by foreign capital to construct and

operate—on a scale far beyond the build-operate-transfer (BOT) offerings of any other economy in the region. The effect was to open a range of projects for possible foreign investment that multiplied the potential opportunities for private sector investment. Fourth, China's reform was accompanied by parallel efforts to tap East Asia's fast-growing reservoir of investable portfolio funds for China's development.

In effect, China energized a quadruple-powered magnet for foreign investment, boosted by its low-cost labor advantages for export production, its huge and burgeoning domestic market, its unleashing of competition between provinces in ways to attract investment, and its opening of infrastructure projects. In addition, China began to open to foreign investors some of its natural resource potentials, including limited blocs of the far-western Tarim Basin for oil prospecting. By mid 1992 China had begun to attract levels of new foreign direct investment in unprecedented amounts, largely from Chinese investors in Hong Kong, Taiwan, and Southeast Asia. In the same period, foreign direct investment flows to manufacturing in Thailand, Malaysia, and Indonesia declined markedly—probably from a mix of dimming attractions and competition from China.

Nineteen ninety-three saw the beginnings of sustained economic reforms also in India, with the advent of Prime Minister P.V. Narasimha Rao. Following long after China's first reforms, India began to introduce market-oriented liberalizations. Measures to attract FDI and to promote closer economic relations with East Asia followed. Modest foreign direct investment flows have begun, currently in the vicinity of \$4.6 billion annually, mainly from East Asia. Shortages of semi-skilled and skilled labor in ASEAN countries have made India, with its large pool of low-wage engineers and technicians, a particular attraction in software and computer-related industries, as did the opening to competition of domestic markets in certain utilities. India still pales as a competitor to China for foreign capital. Yet, because of its size, abundant cheap labor, and impressive human resource skills, India must now be included as part of tier 4 with considerable potential to compete with ASEAN countries for foreign capital, as they become overpriced or short of labor or skills.

Also a late-comer relative to China, Vietnam too has important advantages as an attraction to foreign capital, including offshore oil prospects, numerous industries damaged or neglected during the war, and a labor force that is underemployed but has skill levels at least comparable to those in most ASEAN countries. It also has a particularly rich agricultural base and, after years as a food-deficit economy, has again become a substantial net exporter of rice. From 1987 to mid 1994, Vietnam has attracted over \$10 billion in foreign direct investment commitments, with Taiwan as lead investor.

Special features of the 1990-94 transition to tier 4

This period began to look like a repeat of the now well-established pattern of upper tier to next-lower-tier industrial relocation. Literally tens of thousands of enterprises in Hong Kong and Taiwan hollowed out their domestic manufacturing bases and moved production operations to China—early on to the Shenzhen special economic zone immediately adjacent to Hong Kong's New Territories; later to other parts of Guangdong province or to neighboring Fujian province just north. Rather rapidly the boom spread to coastal China's major municipalities, including Shanghai and adjacent Fuzhou province, and to Xiamen, Tianjin, and northward. Major overseas Chinese investors from Singapore, Indonesia, Malaysia, and Thailand joined the investment rush to China.

Major Hong Kong entrepreneurs such as Gordon Wu and Li Kashing developed multi-billion dollar infrastructure projects, including power stations and extensive toll-road networks. These projects, were interpreted not only as path-breaking types and sizes of foreign investments but as demonstrations of the types of unique contributions Hong Kong capital and management could make to China's future development; implicit was a condition: "...so long as China is willing to let Hong Kong be Hong Kong after its reversion to mainland control in 1997."

Implications of special features for future regional dynamics

Several special attributes to this transition are important in looking at how these basic regional economic dynamics will play out over the next 15 years. They represent new dimensions of the process and

appear to suggest changes that we may see in the future impact of these dynamic regional market forces.

Foreign investor area concentrations. FDI in China through the early 1990s shows a stronger tendency to locational concentrations by economy of origin than in previous transitions, for reasons of history and geographic proximity:

- Hong Kong and Taiwanese invest in Guangdong Province
- Taiwanese in Fujian
- Japanese in Dalian
- Koreans and Japanese in Tianjin.

Through 1993, following Hong Kong and Taiwan at a distance, the United States, Japan, Germany, Britain, and Thailand were the largest foreign investors in China.

Shift toward demand-pull dynamics. By 1990 most of the initial post-Plaza Accord currency adjustments had worked their way into relocation investments by Japan in the ANIEs, and by Japan and the ANIEs in Southeast Asia. The superheated growth of the late 1980s created two sources of demand for foreign investment in tier 3 and 4 countries—to meet a tremendous build-up of infrastructure requirements in literally every country in the region, and to respond to the first real burgeoning of consumer demand. By moving early to open its markets to the application of foreign capital in supplying both of these needs, China added its active demand-pull to the emerging cost-pushed investments looking beyond ASEAN for a cheaper base of operations. But the growth of a region-wide consumer market was also responsible for the transition noted above in the ASEAN toward greater foreign investor production to satisfy local market demands.

Establishment of China as a new source of regional growth. The timing and size of this shift was a key factor in sustaining overall rapid growth within the region because it was developing just as Japan in 1990 was going into a prolonged slump and as European and U.S. economies were also going into recession. That East Asia experienced only minor reductions in growth rates in some countries dem-

onstrated how far East Asia has progressed in intraregional economic integration, and particularly the economic power of the China market as a source of stimulus to the regional economy on a scale comparable to Japan. Typically, Japan has (1) exerted its stimulus through its foreign aid and investments, associated with exports of related implementing equipment and other material, and (2) exerted little stimulus by expanding imports from the region. By contrast, China exerted much of its stimulus through its growing demand for both investment goods and consumer goods.

Dynamics devolve to provincial level in China. Cost-push dynamics in East Asia have operated predictably at the level of national economies, at least until 1993. At that time, the surge of foreign investor interest in Guangdong province was so concentrated that it quickly produced the predictable consequences at a provincial level. So intense was the early demand for property and labor in the coastal Shenzhen special economic zone that rents and land prices were quickly pushed up near those of Hong Kong, causing investors to look inland beyond its borders. The process then spread westward in Guangdong and spilled northward into Fujian province. With more than 10,000 new enterprises established by Hong Kong and Taiwan investors, and an estimated 135,000 mainland enterprises attracting foreign investment, the demand for labor, construction, and production materials rapidly pushed up costs, drawing in supplies from other provinces. Millions of workers migrated from distant provinces in response to shortages along the coast. By 1994 the mass of migrant workers in search of higher paying jobs was estimated at between 100 and 150 million.

Soon the Shanghai municipality and adjacent Jiangsu province became the new hot growth area, with Tianjin and Dalian close behind. By 1994, Shanghai was the third most expensive city in Asia. Also in 1994 larger investors from the United States and Japan were involved in more projects further north and inland, as China emphasized development of infrastructure to attract foreign investors to less developed parts of the country. By the end of 1994, the most developed and accessible parts of China had experienced rapid growth and rising inflation. Country-wide inflation has persisted in a range

from a 25- to a 30-percent estimated annual rate. It has become a serious threat to China's ability to sustain high growth.

The progression of cost-push in China's internal dynamic is limited to causing investors to look beyond the most popular locations, and does not, so far, extend to causing investors to relocate extensively to remote provinces. However, the scope of cost increases associated with China's rapid development has some dimensions that have caused cost-push pressures to develop with surprising speed. Unlike Asian economies in the top three tiers, China began its reforms with a command economy system, and only gradually has introduced market-oriented institutions. Because it still lacks much or even most of the administrative and regulatory structures appropriate for a market-oriented private enterprise economy, its system still operates largely according to the rule of individuals according to their status and connections rather than rule of law. The result has been many special fees and levies, much corruption, and many uncertainties about commitments and ground rules. Investors are also experiencing high costs and delays associated with shortages of labor, land, and infrastructure that have progressively eroded the attractions of doing business in China for at least the near term.

Erosion of China's attractions. As China began to attack its excessive inflation in 1993, it has reversed, at least temporarily, a number of reforms and attempted to regain control of credit expansion, which has been a principal source of the inflation. However, authorities have also reversed or limited some earlier policies seemingly unrelated to inflation, by proposing to reduce substantially the maximum rate of return allowed foreign investors in power and similar infrastructure projects, and by reneging on commitments to some investors.

Between July and October 1995, Chinese officials made a number of decisions that have raised serious concerns in foreign investors' minds. They pushed allowable rates of return on investment in major infrastructure projects lower to a 12- to 15-percent level compared with the 18 percent or higher many investors consider the minimum necessary. They imposed a non-rebatable tax that raises the cost of using local materials in goods manufactured for export. Some official

institutions refused to make good on some bad loans. A 20-year lease held by McDonalds at a prime Beijing location was revoked without consideration. These and other developments demonstrated an insensitivity to the conditions necessary for a stable investment climate and provoked a serious anxiety attack in the foreign investor community.⁴⁴

Tier 3 may still be competitive. Until now, once the economies in an upper tier lost competitiveness, there was no way back. However, the rapid erosion of China's cost advantages in its most promising economic regions, the institutional, legal, and administrative uncertainties, and other deterioration in the investment climate have diminished its attractions compared to more economically stable economies, even those with somewhat higher labor costs. Some reports indicate reduced FDI inflows from smaller investors. Approval of a larger number of major investment projects may be offsetting these declines to date.

By contrast, particularly the ASEAN countries have now recognized China's ability to attract capital and have responded by further liberalizing their foreign investment regimes and incentives, and by strenuous efforts to overcome infrastructure shortages and skill shortages. Although their investment climate deficits have not all been resolved, they have the added attraction of much better developed and appropriate legal, administrative and regulatory systems, and of a much higher degree of political and financial stability (read low inflation rates). In particular, none faces the imminent prospect of the major change in top leadership that confronts China. Several ASEAN countries have begun to record increased FDI inflows in 1994-95, including Indonesia and the Philippines. In addition, Vietnam, while sharing some of China's disabilities as a reforming command economy, has controlled inflation and acquired an excellent reputation with the aid donor and foreign investor communities for its progress in economic reform. As a result, Vietnam appears well positioned to join with the ASEAN countries in expanding their share of foreign

44. "Honeymoon's Over: After the Initial Ardor, China and Foreigners Argue About Money," *The Wall Street Journal*, December 2, 1994, 1.

capital inflows near term, while China struggles through a period of reversals.

Economic dynamics and trends, 1995-2010

In sum, the basic pattern of economic dynamics that will shape the growth and integration of East Asian economies to 2010 and beyond includes:

- National economic growth patterns
 - Strongly leveraged by very high domestic savings and investment
 - Market-oriented export-led strategies.
- Cost-pushed relocation of competitively marginalized products
 - Cost advantages in labor- and land-intensive (and in some cases energy-intensive) industries gradually eroded by high growth rates
 - Competitiveness further eroded by infrastructure and skill shortages, and costs of environmental protection and remedying previous environmental damage.
- Economic complementarities of lower-tier economies, which attract development capital and investments for relocation of marginalized land- and labor-intensive industries from more developed upper tier economies, because of their
 - Resources and energy supplies
 - Un- or under-employed labor and skills, as a result both of larger populations and of development processes that were some years behind upper tiers.

As it happened, tier-3 (ASEAN) development has lagged behind the tier-2 NIEs by roughly ten to 15 years, and tier 4's aspirant NIEs behind tier 3 by roughly the same length of time. Thus, the cost-push relocation process, with its cascading of foreign direct investment from the upper tiers progressively toward the lower tiers has also accelerated the development of both of those lower tiers in their turn.

That Asianization process will continue after the turn of the century, but will slow down beyond 2010 as development peaks in tier 4, with the world's two most populous economies and biggest underdeveloped land masses. The progression of capital flows toward ever more abundant populations comes to an end with the EMIEs of tier 4, because tier 5 is composed of smaller, more sparsely populated economies. Once those economies begin a significant development effort, the focus will shift initially toward their agriculture and natural resource potentials.

Appendix B: Outlook for particular economies and groups

This appendix discusses economic prospects for individual countries and groups of countries for readers with particular interests not addressed in the body of the report.

Japan

Because Japan was Asia's principal spur to regional growth through the 1980s, the study first considers how key variables will affect its likely impact through 2010.

Population patterns

Differing population patterns of three Asian economies are particularly influential. Japan's population, small as it is in an Asian context, has particular impact because of Japan's great per capita income and accumulated wealth. By 2010 Japan's population growth will have fallen short of its replacement rate and will have begun to decline from a peak of about 126 million to about 124 million by 2030. With one of the world's most rapidly aging populations, Japan will see its labor force decline even earlier and more markedly than its overall population, barring major changes in present employment policies and practices.

In managing its labor force, Japan has the capability to offset significantly the impact of population decline by making much more efficient use of its human resources. Despite its low fertility rate, female labor force participation, at 47 percent, is much lower than U.S. and European rates, which average close to 60 percent. Japan could also promote much more productive use of women now in the work force. By deregulating agriculture and distribution, it could gain much more efficient use of large pools of labor in those sectors. It could

also open its economy to foreign labor. However, Japan's politicians continue to show extreme reluctance to move in any of these directions, which accounts for the low GDP growth rate selected.

National savings and investment

With a declining work force to support its aging population, Japan can expect to see its national savings rate decline from 32.8 percent in 1993 to a projected 25 percent or lower by 2010. This study also projects a low GDP average growth level of roughly 2.5 percent for 1995-2010—slightly lower than that for the United States, which will benefit more from trade liberalizations in the Americas, and in Asia. Japan's trade surplus with the United States should decline in constant dollar terms over the final decade, and *could literally be approaching a balance by 2010*, assuming that the U.S. savings rate does not deteriorate from present record low level.⁴⁵ (Much of Japan's former trade surplus with the United States will then accrue to ASEAN, ANIE, and EMIE economies where Japanese export industries have relocated.) With a shrinking labor force, Japan will face relatively high wage increases and exceptionally high capital costs per worker, which will strengthen its incentives to continue investing heavily offshore.

45. One Japanese author predicts that household savings rates will begin to decline in 1997 and bottom out between 5 and 15 years later. He foresees a Japanese current account balance barely in the black by that time. See Hiroshi Ogai, "Don't Count on High Yen: Aging baby boomers will suck up savings and overseas surpluses," *JAPAN UPDATE*, January 1995, pp. 10-11, published by the Keizai Koho Center. These observations ignore Japan's offshore economy, which will enjoy high and rising corporate savings and strongly growing and positive trade balances, which will show up in the accounts of the ASEAN, Chinese, Vietnamese, and other regional economies. Unlike the United States, which has suffered a sharp reversal of its net foreign assets and now has net negative capital transfers as a result of dividends and interests paid to foreign holders, the Japanese current account balance will benefit from net foreign assets that will continue to grow at least through 2010 and will continue to generate substantial net interest and earnings reflows especially in years of reduced reinvestment abroad of offshore earnings.

Greater Japan

By 2010, however, GDP will no longer be an adequate measure for Japan's overall economic power or vitality. By that time roughly 25 to 30 percent of Japan's manufacturing and service sector capabilities will be located offshore, predominantly in Asia's fastest growing and most profitable economies. To date the offshore share of Japan's production has grown rather slowly, flat at 3 percent from 1982-85, but rising from 1986 to 6.4 percent in 1993, while U.S. overseas production was increasing to over 27.5 percent.⁴⁶ There is every reason to expect Japanese firms to continue reinvesting their offshore profits in offshore locations. Japan's offshore base will be growing at double to triple Japan's GDP growth rate, in large part because of these reinvested earnings. Combined with strong FDI outflows from Japan, we can expect Japan to extend its economic dominance and influence, particularly in the ASEAN countries, Vietnam, India, and to the extent that conditions allow, particularly in China. Japan's domestic economy will gain from this offshore economy both because of Japan's practice of taxing offshore earnings, and because domestic research, product and technology development, design, marketing, and other support functions will continue to be carried out in Japan proper. Because foreign investments continue to have an exceptionally high export component, Japan's offshore investments will also expand its control over foreign trade flows in the region, and its reflows of earnings as this foreign asset base expands.

Complementarities

Because Asia will far outpace the rest of the world in demand for transportation, communications, and information services—high-tech areas in which Japan excels—we can expect that Japan will

46. These data considerably understate the significance of Japan's offshore production if they follow government's usual accounting practice of omitting production facilities funded by reinvested earnings of Japanese joint ventures and subsidiaries abroad. These ventures, particularly in Southeast Asia, have been considerably more profitable than Japanese investments elsewhere, thus spurring more reinvestment than in other areas and providing the profits to finance them.

concentrate much of its FDI outflows and offshore profits in these sectors. Whereas Japan's offshore assets grew mainly in manufacturing, trade, and finance in the 1980s and early 1990s, we can expect a marked shift toward service sector investments approaching and beyond the millennium. Japan will continue to be a major source of aid and capital to tiers 2 through 4. It will continue to relocate some manufacturing offshore even beyond 2005, but will focus increasingly on Asian infrastructure and service sector needs.

Infrastructure and environment

Japan's accumulated and neglected infrastructure requirements are estimated at \$3 trillion through the end of the century, including much related to environmental neglect. Bureaucratic and regulatory gridlock make these high-cost investments. Finance Ministry conservatives oppose deficit financing, so only the most urgent projects, like the Kansai airport, will get done. Public works will thus add little to the growth prospects for the domestic economy, unless political fallout in the aftermath of the Kobe earthquake or another natural disaster forces changes in the current priorities.

A chronology of the outlook for Japan

Japan will recover slowly from its prolonged 1990-94 recession with its five years of declining profits.⁴⁷ Under pressure of yen appreciation, Japan is undergoing a fundamental transformation from the rapid 5-percent export-led growth of the 1980s, to slower consumer-led growth in the mid 1990s. At best, Japan hopes to average 3-percent growth in the coming decade. From self-confidence bordering on arrogance, Japanese managers have recently shifted to soul-searching and loss of confidence. Continued political confusion generates a generally cautious political and economic environment. Industry is engaged in reassessing hallowed economic practices such as lifetime employment, cross-holdings of *keiretsu* family equities, and even some traditional alliances. Japan's big integrated electronics producers will regain strength quickly and retain competitiveness, as will its preci-

47. William Dawkins, "A mood of muted optimism prevails," *Financial Times Survey: Japanese Industry*, December 6, 1994, page I.

sion instruments and equipment sectors. Steel, automotive, and consumer electronics sectors, and many others to a lesser extent, continue to suffer from overcapacity, surplus stocks, and excess employment.

The fallout from shocks to Japan's financial structure from collapse of its bubble economy and losses of up to two-thirds on some foreign investments continue even now, several years later, with seemingly widening ripples and consequences continuing to depress the economy. As a result Japanese firms will be much less aggressive in expanding investment outflows, especially outside Asia. Adverse experiences with future investments in China will cause firms to concentrate investments at home, in ASEAN, India, and Vietnam. Despite lower overall FDI outflows, their concentration in Southeast and South Asia will represent high levels for that region.

Long-neglected infrastructure projects will absorb a growing share of government and private investments. Trade surpluses will decline through 1995 but then resume their expansion again as Japan continues to restrain foreign investments through 1998. Thereafter, the surplus will decline as Japan's national savings rate declines with increased consumption by an aging population. Japan's population will stabilize at 125 million in 2005 and decline thereafter. Its labor force will begin to decline even sooner. To compensate for acute labor shortages, by 2005 it will begin to promote and train women for key positions in the economy, and expand immigration of skilled foreign workers and professionals on a carefully controlled basis.

By 2005 the aging and shrinking of Japan's work force will visibly erode the national savings rate and economic growth, and its trade surpluses will finally begin a secular decline. As partially integrated Korea becomes increasingly successful in challenging Japan's lead in automotive and advanced electronic technologies, as do Singapore, Taiwan, and India, Japan will intensify its efforts at technology leadership and applications to new types of products.

China's pressing domestic development requirements will bring recovery of reforms in China needed to attract rising levels of Japanese investment, particularly for expansion of China's energy supplies and energy efficiency. Japan will continue to expand foreign

aid, lending, and investment abroad as it tries to reduce pressures to appreciate the yen further. From an aid level roughly equivalent to that of the United States in 1994, Japan will increasingly outstrip the U.S. as a global bilateral aid donor.

The growing profitability of Japanese investments in ASEAN, Vietnam, and India will finance continued further expansion of investments there, giving Japan an overwhelming position and influence in the Southeast Asian economy. As the yen appreciates toward ¥70 per dollar by 2010, Japan expands its offshore production to more than 20 percent of GDP and 30 percent of manufactures, located mainly in ASEAN, coastal China, Vietnam, and India. Japan continues to dominate world automotive production, but will lose market shares to Korean joint ventures and domestic producers in China and Europe. Japanese firms will have to rely on greatly expanded strategic alliances with U.S. and European countries to maintain market position in electronics, computers, communications, and multimedia.

Because of its greatly expanded offshore production base in Southeast Asia and its continued domestic dependence on imported energy and food, Japan will become increasingly preoccupied with strengthening its sea and air lift capacity, its shipbuilding industry, and transportation technologies. In addition, China's growing energy and food import requirements will have generated a major expansion of shipping tonnage passing through the South China Sea, its southern straits, and the Indian Ocean. Japanese concerns will focus on assuring the safety and security of regional sea lanes.

China

Because China has become the swing economy in determining the vigor of regional economic growth, it is assessed out of sequence with the tiered economic groupings. Table 3 in the main text (p. 48) reflects projected outcomes of two different scenarios. This section first addresses the optimistic scenario "reform continues," and then discusses scenario two ("conservative reaction/repression").

Scenario one—"reform continues"

Since mid 1993 China has made continuing efforts, with gradual success, to dampen inflation initially ranging between 25- and 35-percent annual rates. A number of measures have modified or reversed some of the market-oriented reforms achieved previously, and have sought to regain more central control over banking credit and government finances. Ironically, one of China's most committed reformers, Senior Deputy Premier Zhu Rongji, has implemented most of these measures. They include reintroduction of price and credit controls, and new tax measures to recapture revenues for central government from the provinces.

Under this scenario, following the demise of Deng Xiaoping, reformers would retain a controlling position in the collective leadership, reinforced by support from the provinces, and would resume emphasis on economic, administrative, regulatory, and legal reforms after 1996, once the annual rate of inflation is reduced to around 10 percent. Specifically, they would:

- Relax financial controls and relax and progressively end price controls
- Resume extensive reform, with emphasis on privatization of state enterprises and revitalization of agriculture
- Press for early trade liberalization and membership in World Trade Organization
- Selectively resume implementation of major infrastructure projects
- Resume emphasis on attracting foreign capital and management to finance and implement major infrastructure, public utility, and other development efforts
- Emphasize measures to restore foreign investor confidence and to reform administrative, regulatory, and legal structures to accelerate market-oriented development.

Credibility of these efforts in attracting foreign investors will depend heavily on effectiveness of China's efforts to wipe out or greatly

reduce corruption, and broaden market-oriented legal and administrative reforms and the rule of law. China's leadership would subordinate political issues with its neighbors in the interest of attracting investors and accelerating cooperation in economic development and reform issues.

Because of China's expanding dependence on foreign resources, 1997 reversion of Hong Kong to Chinese control proceeds smoothly, with only modest disruption of existing economic relationships. Taiwan is permitted to continue business as usual with the mainland through Hong Kong. Even so, reformers do not simply accept existing relationships with Taiwan and Hong Kong. They emphasize development of Shanghai as a major financial center and port, and as an alternative to reliance on Hong Kong. They also intensify China's effort to expand food output and achieve its very ambitious goal of grain self-sufficiency by 2000, and to realize sufficient infrastructure investment to overcome bottlenecks in transportation and energy. China will also selectively encourage short-term export of semi-skilled and even skilled labor to labor-short Asian neighbors to help overcome foreign exchange deficits created by growing food and energy shortages.

A major source of concern is China's increasing rising deficit in oil. By 2000 China's oil imports will have begun to drain financial resources urgently needed for infrastructure and state enterprise modernization. As the Tarim Basin and other onshore prospects disappoint, China, as it meets no resistance, intensifies its quiet encroachments on additional shoals and atolls of the Spratlys. It does so to protect and expand its claims, and, in addition, contracts with foreign companies to expand exploration in adjacent areas to improve its claims of prospective oil resources there. Should tensions rise, it will lash out mainly against Vietnam as a means of convincing other neighbors that it is serious about consolidating its Spratly claims.

In spite of tensions in the South China Sea, China will participate more fully and extensively in APEC activities, and in the Asian Regional Forum. By the end of the decade, it would also permit Taiwan to participate more fully in APEC activities.

Prospects for this scenario

The main protagonists for this scenario are officials of coastal and other reform-minded provinces and municipalities. Although Zhu Rongji is the leading reform activist within the top leadership, he has reversed some reforms and strengthened central banking and taxation authority in an effort to control inflation—actions opposed by key provinces and dissidents in the National Peoples Congress (NPC). Thus far it is hard to see any signs of support coalescing around any other reform activist, although Qiao Shi, chairman of the NPC, shows signs of support for reform.

Strongly working against this scenario are the scope, persistence, and intractability of China's present inflation. It has become so entrenched and so associated with corruption, severe erosion of urban/rural and coastal/inland income equality, popular discontent, and centrifugation of political authority, that the government will be hard put to regain a sustainable level of growth, monetary stability, and economic order in less than two or three years. Only beyond 1997 is there much likelihood that reversed or suspended reforms can gradually be reinstated. To complicate prospects further, the government has been erratic and unreliable in supporting commitments to foreign investors.

While not recanting or attacking reform, Premier Li Peng has begun openly to espouse more conservative policies, suggesting, for example, that state sector reform will now focus more on strengthening rather than privatizing these enterprises. Li is considered leader of conservative forces within the government, but prominent supporters have diminished with aging and demise. President Jiang Zemin has been visibly active shoring up his position with key appointments, state visits, and administrative moves. He is apparently an active force in recent moves to attack corruption among some supporters of Deng Xiaoping and some of the so-called princelings; however, he has shown no sign of policy initiatives to revitalize reform.

Overall, this reform-continues scenario appears to have, at best, a 30-percent probability prior to 1998, rising to roughly a 50- to 60-percent probability thereafter, following an initial period of conservative reaction.

Further detracting from prospects for early return to reform is China's remarkable consistent pattern of spawning periodic periods of inflation followed by tough measures to curb them—popularly known as the stop-go or boom-bust economy.

Formative factors

Population: Because China's population pressure on its arable land is the greatest of any country in the world, population growth has long been a major policy preoccupation. China still adds an estimated 11-12 million to its population each year. Yet, a combination of fast growth, incentives, and government pressures has limited family size and reduced the average annual population growth rate to about 1.1 percent annually, fourth lowest in Asia after Japan's 0.3 percent, South Korea's 0.9 percent, and Taiwan's 1.0 percent. Even so, this population growth aggravates urbanization, takes land out of cultivation, increases energy and resource demand, and increases the costs of periodic food shortages caused by weather and natural disasters. On the other hand, it also assures that China will have surplus labor well into the next century.

National savings, investment and competition for capital: If we can believe Chinese statistics, China has achieved an extraordinary ratio of national savings to GDP for such a poor country—35.5 percent. Three years of growth exceeding 11 percent combined with large and expanding foreign exchange reserves provides some supporting evidence. More amazing is China's success in attracting an estimated 30 percent of the total world flow of FDI to developing countries—an estimated \$25 billion of an \$85 billion world total in 1993. The speed of this investment tidal wave, beginning in early 1992, produced extensive localized shortages; ballooning prices for property, rents, and public utilities; a feeding frenzy in newly opened legal and illegal stock markets; and a flood of land, commodity, and stock speculation along the southeast coast. Rampant corruption, official opportunism, infrastructure shortages, and a chaotic business environment were evident in the hottest areas: especially Shenzhen, Guangdong, and Fujian (e.g., Xiamen and Fuzhou cities). Other preferred investor locations—Shanghai, Tianjin, and Dalian and their adjacent provinces—experienced inflation exceeding 30 percent. Increasingly, investors are having to look further north and inland, but are finding

distance, infrastructure shortages (especially power and transportation), political, and other inhibitions much greater than along the coast.

Whether devoted to feeding speculation or implementing infrastructure projects, credit expansion contributed to inflation. Most intractable was credit going to the largest source of the problem—the two-thirds of state enterprises that ran deficits and faced having to lay off workers if credit was cut off. Politically, Chinese authorities found it much easier to fight inflation by clamping down on land and real estate speculation and by delaying investment projects. Whether from insensitivity, inadvertence, or by design to cool foreign investor ardor and inflation, since early 1994 Chinese officials have taken a series of actions that call into serious question their sensitivity to the requisites of maintaining a favorable foreign investment environment. Most disturbing were repeated signals that Beijing would no longer allow levels of return on capital that investors consider necessary given China's high risks. Authorities insisted on limiting them to a 12- to 16-percent return on investment that has reportedly deterred or postponed decisions on many investments especially in the power sector. Leading infrastructure investors like Gordon Wu are currently reconsidering investments, and reporting their intent to consider India and revisit ASEAN. Although FDI inflows to implement previously approved projects have risen in 1994 some 20 percent over the previous year, the flow of new commitments has declined by roughly a third. Beijing measures to curb credit and speculative projects have deflated property and other asset values. Foreign bankers and investors have been badly burned by violated Chinese commitments.⁴⁸ Many Japanese investors may easily be reminded by these incidents of bitter disappointments over projects in earlier years involving Bo Hai Bay and the Bao Shan steel works.

Unpromising as the present appears for sustaining reform and foreign investor contributions to it, the reform-continues scenario

48. See "Honeymoon's Over: After the Initial Ardor, China and Foreigners Argue About Money: Mainlanders Assail Swindles; Overseas Investors Gripe About Arbitrary Policies," *The Wall Street Journal*, December 2, 1994, 1.

assumes that China is passing through a too-familiar and rather messy phase of retrenchment to pave the way for restarting reform in a year or two. Officials continue to predict a soft landing and a cooling of growth to 8 percent in 1996, as they did the previous year. Latest estimates suggest a result closer to 10 percent.

On the basis of these assumptions, China can be expected to sustain high internal savings and to reburnish its attractions to foreign investment—both actions supporting a continued high rate of economic growth through at least the end of the century.

Complementarities: At an 8- to 12-percent growth rate, China complements the production and service potentials of all of Asia with exciting marketing opportunities in both consumer and investment sectors—as long as it has the investment inflows, export earnings, and/or foreign exchange reserves to pay for them. By emphasizing market forces and foreign investment, China assures that its development will capitalize mainly on its low labor and land costs and competitive resources and that its longer-term potentials revolve mainly around its attractions as a low-cost production base.⁴⁹ It would seem that China's massive 150–200 million strong pool of migrant workers in search of work would almost guarantee China's labor cost advantages for the indefinite future. However, investors have found many other costs and complications of doing business in China that can offset and even negate its labor cost advantages. Even after things have cooled off somewhat, space rentals in leading investment locations remained as much as 4 to 6 times those in ASEAN capitals. One can expect that other non-labor costs of business may be commensurately high. Thus, finding cost-effective complementarities in China has become much more difficult and exacting. We can expect China's share of global foreign investment flows to decline sharply in 1995

49. A more conservative and nationalist regime would be inclined to overrule market forces to concentrate on strengthening state enterprises and national industries in sectors in conflict with its true competitive and complementary advantages. This path would accentuate competition with similar Asian industries and considerably reduce the complementarity of China's development with economic specializations elsewhere in Asia.

and beyond from its 30-percent high. Still, it would remain a major competitor to tier-3 and -4 economies for the available supply of foreign direct investment and portfolio capital. Whatever happens in infrastructure, China should have less difficulty continuing to attract investments in oil exploration and development needed in areas that can especially benefit from higher economic growth, with the exception of the Spratlys.

Infrastructure: Only time will tell whether recent Chinese policy and practice has done lasting major damage to foreign investor interest in infrastructure projects. It will still have access to important Japanese aid financing. If reformers stay at the helm, it is imaginable that Chinese officials, in inescapable recognition of the enormity of China's infrastructure needs and the unsustainable nature of its present growth rate unless these are met, will work hard to repair recent damage to the confidence of major responsible international investors.

The intersection of China's growth trend with power and transportation inadequacies illustrates the problem well. China's domestic energy prospects—oil and gas potentials in the far west, at least a century's supply of coal in the northwest, and tremendous hydroelectric potential mainly in south-central Sichuan province—are mainly very remote from its main industrial areas along the east coast. Rail transport to carry coal is heavily overloaded and in a tenuous state of repair. It is possibly the most intensely used rail network in the world other than the trans-Siberian. Alternative means, such as oil and coal slurry pipelines, will be expensive and time-consuming to build.

In industrializing economies, energy demand typically outpaces GDP growth. In China, coastal industrial growth rates of over 20 or 30 or 50 percent are claimed for various areas over the past two years. Sufficient thermal and combined-cycle power stations seem to have come on line to prevent any international-media-worthy power shortages, but probably many investor projects have brought in their own power generation. At least in terms of officially recorded power generation, China has been able to expand capacity within a range of from 4 to 7 percent per year—seemingly not nearly enough to sustain 9- to 12-percent GDP or 20-percent industrial growth rates. We have

not yet seen any studies purporting to indicate when China's time to pay the piper will come, and it must face either curtailing growth or accelerating power infrastructure. That time cannot be far off.

Recent reports estimate that China will need \$233 billion of investment in infrastructure to avoid limits on future growth, with the largest amounts required for power 28 percent, telecommunications 24 percent, roads 22 percent, railroads 20 percent, ports 3 percent, and airports and inland water 1 percent each. Citing "decades of neglect" in the transportation sector where investment has declined as a percent of GDP, one report asserts that China experienced \$70 billion in lost production in 1992 because of delays in delivering coal from northern mines to the industrializing south.⁵⁰

Environment and resources: There are still more pipers for China to pay. In 1993 China became a net oil importer for the first time in decades, probably an irreversible trend. As current oil fields play down, China has been slow to develop offsetting sources. In the Tarim Basin of extreme western Xinjiang province, foreign oil companies complain that the Chinese have put only less promising blocs up for bid. At least one geologist claims that, rather than the huge Saudi Arabian type reservoirs imagined to exist, the Tarim Basin structures are badly fractured, and the oil pools dispersed and fragmented. This makes for very costly development, quite apart from the cost of a pipeline extending north of the Great Wall to avoid costly mountainous terrain. If Tarim indeed proves too slow, difficult, or costly, the offshore blocs on the continental shelf surrounding the Spratly Islands will take on greater appeal as China's oil deficit rises.

Coal presently fires the majority of China's power requirements, but it also does much to account for China's 11-percent contribution to the world's CO₂ emissions. Brown, dirty, and sulphurous, coal is the least satisfactory of solutions to China's power needs. Even now the rail system cannot cope with the demands for coal transport to coastal growth areas. Japan, recognizing the hazards to its own environment from expanded thermal-power use of Chinese coal, is committing

50. Tony Walker, "China must raise transport spending," *Financial Times*, December 6, 1994, 6.

substantial and growing amounts of aid and investment funds to help China improve its energy efficiency and environmental sustainability in the power sector. Projects include extensive use of scrubbers, desulfurization processes, and a coal slurry pipeline. In addition to air pollution and acid rain, China faces serious but possibly less urgent environmental problems of water contamination from industrial waste. China projects rising coal exports to help pay for its oil imports.

Finally, to close the loop by circling back to population growth, China faces unenviable and inevitable food supply problems. As if 13 million new mouths each year weren't enough, China faces loss of cultivated land because of erosion of marginal lands, conversion to urban and industrial uses, and other causes. The per capita population pressure per unit of cultivated land thus expands steadily. By one extreme estimate, China will develop a food deficit that, by the end of ten years, would require virtually all the world's present exportable surplus just to meet China's needs. By one calculation based on Chinese estimates, China loses each year 7 million hectares, or 0.39 percent, of its cultivated land to other uses, and a projected 0.9 percent annual population increase, for a net yearly increase of 1.3 percent in burden on remaining cultivated land. If such losses continue, by 2000 the ratio of cultivated land per capita would decline 7.8 percent. By 2000 China would need an additional 90 million tons of food. It could well be worse, to the extent that, with rising incomes, people choose to consume more poultry, pork, or beef, which, respectively, require much larger amounts of grain.

From another vantage point, to stay even would require good weather, no natural disasters, and at least a 1.3-percent annual increase in agricultural productivity with no change in diet. There have been reports of favorable prospects from a new rice hybrid that could expand per-hectare output by roughly 25 percent. If this new plant proves out in time, China's food shortage might be postponable, but it could be 10 years before the results are proven and enough seeds available.

In any event, through some combination of increased oil and food imports, there is a strong possibility that China will have vastly

increased requirements for tanker and dry-cargo maritime capacity to meet its growing import requirements for energy and food. This probability has important implications that would seem to conjoin U.S., Chinese, and Japanese interests in expanding and improving the security of sea lanes, sea lift capacity, and port and harbor facilities. It would seem well worth the cost and effort to commission a special study to attempt to estimate the probable magnitude of these food and energy import requirements.

Prospects: Through the mid 1980s, China made steady progress in reform and generally “got it right.” Reformers successfully emulated most of Asia's success measures, including early agricultural reform, high savings and investment rates, market- and export-oriented policy reforms, declining fertility, and commitment to state enterprise reform. Most remarkably, Dengist reformers succeeded in reducing the income gap between urban and rural workers from 3-1 in the mid 1970s to 2-1 by 1985. The government has unfortunately got it very wrong in failing to contain inflation, which resulted in panic buying and shortages as a run-up to the Tienanmen incident, and got out of hand again in late 1992 through 1993, apparently bringing regression to a 4-1 urban-rural income ratio. The reform-continues scenario takes the optimistic view that the government can somehow get the inflation genie back in the bottle, begin to undo the reform reversals, and get some new reform momentum under way. In the meantime, cumulating infrastructure shortages are likely to begin to cause serious problems for growth. It is difficult to see forward momentum on reform resuming before mid to late 1996. Even by December 1994, inflation was stubbornly persisting at or beyond the 27-percent level, despite restoration of food and numerous other price controls. Assuming that the post-Deng reform leaders can contain inflation, we can see the economy able to sustain average growth of up to 7 to 8 percent through 2010.

Implications for the region: If it is correct to give China, and the appeal of its massive market, the benefit of the doubt, then we can foresee resumption of reform, extension of its high growth, and an up-shifting of China as East Asia's main growth engine. In this scenario China would regain and hold roughly a 9-percent growth rate from 1997-2005, after which power, food, and transportation

shortages would force growth back toward 7 percent—for an overall average of 7.8 percent for 1994-2010.

Alternative scenario two for China: Neo-conservative reform

China faces continuing crisis from failure of the leadership to control inflation, corruption, and widening and deepening income inequities. These problems were exacerbated in 1994 by major floods and drought and growing social unrest, reduced food production, and sharp increases in food prices. Inflation is hard to tame. To control it by efforts to reduce excessive credit expansion conflicts directly the interests of state and provincial enterprises. Roughly two-thirds ran deficits or barely broke even in 1993-94 and urgently need credit to survive or avoid major layoffs. With the rural population already alienated by cost increases, the government cannot afford to see millions of urban laborers lose their jobs. Thus, it continues to feed this major cause of credit expansion. Plans to reorganize and modernize a selected group of state enterprises have been put on hold if not in the deep freeze.

Deng's death now would leave China mainly in the hands of two conservative leaders who lack charisma and reform zeal: President Jiang Zhemin and Premier Li Peng. It will be easy for them to blame reformers for permitting excesses in the speed and scope of reform that have caused serious inflation, income inequities, corruption, and social disintegration, along with neglect of party discipline and traditional values. It will also give them just the reasons they need to reestablish greater central authority as a means of consolidating their position. President Jiang's recent anti-corruption moves can be seen as one manifestation of this process.

As the conservatives regather the reins of authority in Beijing and in the party, China's economic relations would be dominated by the following main features:

- Progressive reversal of decontrol of food and other prices.
- Reinforcement of the safety net for weak state enterprises.
- Selective reestablishment of central control of distribution of key food, energy, investment goods, and agricultural inputs.

- General shift from privatization to reform and strengthening of most state enterprises.
- Resumption of state allocation of resources and setting of prices in order to protect state enterprises.
- Resumption of state (Beijing) control of infrastructure development and restriction of conditions for foreign participation. (By capping the rate of return for foreign investments in infrastructure at 12-15 percent, the government has already effectively put a great many projects on hold—at the same time reducing the inflationary pressures that such projects generate.)
- Limitation of foreign investment to defined export and special industrial zones.
- Nominal Chinese adherence to terms of reversion of Hong Kong but de facto intrusion of Beijing guidance and controls over financial and trade transactions (in part to favor Shanghai?).
- Increased state role in control of foreign exchange and trade in order to redirect resources to cope with emerging food and energy shortages.
- Greater central intervention in foreign investment relations, causing overseas Chinese investors to shift some investments from China and Hong Kong to more favorable Southeast Asian economies.

Because inflation and disorderly economic conditions in the past two years have generated extensive discontent and resentment, both rural and urban, the odds are better than even that more interventionist government policies may be accompanied also by more repressive political practices.

Continued struggles by conservatives to maintain control over China's ungainly and unstructured economy, with major food, energy, and transportation crises lurking just over the horizon, could ironically favor Chinese efforts to normalize economic relations with Taiwan. To meet its import requirements, China will need all it can

attract in the way of new industrial production for export and will look to Hong Kong and Taiwan investors.

Prospects

This scenario might equally well involve a variant in which China's political posture remains roughly as benign as at present, and only its economic reform and interactions with the region suffer. Because in fact the persistence and intractability of the present inflation is very real, and a surprising number of these reform reversals have in some measure already been implemented, one of the two variants of this scenario would seem to warrant at least a 50- to 60-percent probability for the next three to five years.

However, for a longer term, this scenario probably lacks sustainability. After all, China has been through all this before. Reform was the reaction to the kind of failed policies this scenario represents. Thus, the odds are better than even that this scenario will give way to another by or before 2000. The reform scenario stands a good chance of being the successor, since the rest of Asia will continue demonstrating the merits of market-oriented growth and open, interactive economies, and reform in its more restrained period has brought clear popular benefits. In fact the urgency of acquiring sufficient capital to meet infrastructure, food, energy, and environmental needs makes the open economy solution almost inevitable in the long run. Beyond 2000 the prospects for continuation of this conservative reaction scenario decline to 25 percent or less.

Two swing figures are of special interest and could influence the shape of impending economic conservatism: Zhu Rongji and Qiao Shi. Reformer Zhu has shown remarkable staying power as senior vice premier in the unenviable role of point man in the war against inflation. In the event of the illness or incapacity of ailing Li Peng, Zhu would normally become acting premier; however, he remains the most available scapegoat in the event of any kind of economic crisis. Meanwhile, he is in a position to temper the more conservative economic policy dispositions of Jiang and Li.

Qiao, former intelligence chief and party disciplinarian, has become chairman of the National Peoples Congress (NPC). What makes this

position most interesting is that in 1995 the NPC has begun to leave behind its rubber-stamp qualities, showing a limited disposition for substantial minorities to vote in open opposition to government appointments and policies. This development puts Qiao in a position to mobilize opposition to government policies. Conceivably, the NPC could become a significant factor in shaping future PRC policy. Whether it would take sides with the provinces and municipalities in resisting further recentralization of authority to Beijing is one of the most intriguing speculations.

In any event, taken together, Zhu and Qiao, with the NPC, represent an ongoing potential to temper the degree of conservatism in the actions and policies of China's post-Deng neo-conservative leadership.

India

India began the 1990s far behind China in many respects. Its economic reforms began 13 years later. Its GDP growth was just over half that of China's for the preceding decade. Its industry produces only about 27 percent of GDP compared with China's roughly 42 percent, and its national savings rate remains much lower. But its advantages are also substantial—a literacy rate roughly double that of China's, and a great pool of underemployed scientists and engineers. And of course it has had a much longer, continuous private sector experience, and a legal structure that has many compatibilities with “western” practices. The fact that its three-year-old reforms are working within a stable legal, administrative, political, and regulatory environment will prove to be a major advantage over China if Indian reforms continue to gain momentum over incredibly cumbersome bureaucratic structures and cultural complexities. Current pressures from both business and competition for capital among Indian states contribute to a favorable prospect.

Population

Another major difference between China and India is that India's population is growing some two-thirds faster, at 1.9 percent yearly, and is expected actually to overtake China in total population by

2040. This rapid population growth will exert strong restraint on general wage increases throughout the study period. In spite of having to spread its investments in human resource over a more rapidly increasing population, India has managed to achieve high literacy and a unique depth of engineering and scientific capabilities.

National savings, investment, and competition for capital

India suffers from national savings and investment rates that are barely over half those reported in Chinese statistics. Nor is it yet even near China's league in attracting foreign direct investment, which is reportedly expected to reach \$2 billion in 1995—barely a tenth of China's inflows. Portfolio investment will add a modest \$4 billion more. However, both appear to be on steady growth paths. The reform government of P.V. Narasimha Rao has also been effective in bringing inflation down from 17 percent in 1991 to around 6 to 7 percent in 1993, an achievement that has enhanced the climate for foreign investors.

Complementarities

Shortages of skilled labor elsewhere in Asia make India a popular source from which to import skills. India annually produces 40 percent more graduates in the natural sciences than the United States and over one-third of the number of U.S. graduate engineers. India has attracted substantial Asian FDI in software and electronics production, to the extent that Bangalore has become the "Silicon Valley" of India. In spite of its low wage attractions, India's bureaucratic obstacles have thus far kept it from gaining a clear edge as a low-wage export platform or a reputation for export-led growth.

Infrastructure

India's massive need for infrastructure is one of its principal attractions. It attracted major international interest in 1993 by proposing 41 projects worth some \$16.5 billion for private investors, with a heavy concentration in the power sector. Of these, 19 involve foreign investors. The projects are planned to increase installed capacity by 30 percent. Decision-making and implementation have been slow, however, despite severe strains facing the power sector, which "was clearly

acting as a major constraint on economic growth... with power cuts and equipment failures, which brought the grid close to collapse."⁵¹ Without private investment, India is expected to keep present shortages, representing a 9-percent overall energy shortage and a capacity of less than 80 percent of peak demand, only from getting worse. Overall, however, India's infrastructure shortages appear considerably less daunting than those of China.

Environment

For India the kinds of environmental limitations on growth that China faces also appear considerably more remote. India's per capita power consumption is 56 percent that of China, but its consumption grew more rapidly over the decade 1981-90. Already in 1990 it was the world's fourth largest CO₂ emitter, accounting for 2.9 percent.

Trade liberalization and regional integration

India will benefit from GATT liberalizations, but is neither a current nor a prospective member of APEC. Thus, it will get no special boost from trade liberalization processes. Any progress APEC makes toward liberalization would likely be shared with India and could spur its own trade liberalizing efforts.

Prospects

China's growing economic difficulties and increased disillusionment by foreign investors will certainly divert substantial FDI to more stable, reliable, and lower-total-cost economies. If India picks up the pace of its economic reforms and resolves delays in decisions on foreign investment in major infrastructure projects, it stands a good chance of attracting a minor fraction of these newly migrant FDI funds, particularly over the next two to three years. If foreign investors are then generally satisfied, or even pleased, India stands to become a significant competitor of China and possibly of ASEAN for foreign capital, which it needs even more urgently because of its low

51. "ASIA 1994 YEARBOOK," *The Far Eastern Economic Review*, Hong Kong, December 1993, 133.

domestic savings rates. This will be especially true in engineering and technology industries where it will have a strong competitive advantage as a low-cost design and production platform.

The Russian Far East

Although some increase in trade between Russia and neighbors China and Korea has occurred, only very limited amounts of foreign investments have flowed into the RFE, mainly in telecommunications and other services. For Russia as a whole, a main export growth sector is in military hardware and technology, from which some joint ventures are emerging.

Some large Korean *chaebol* have announced production joint ventures. Mainly, however, natural resource and production projects have been thwarted by combinations of obstacles, including bureaucratic delays, an uncertain legal environment, an adverse tax system, Russian external debt repayment problems, local politics, and weak infrastructure, among others. The Chinese are the most active of all foreigners in business ventures. In fact, Chinese migrants abound as workers, merchants, and farmers, and stir much local resentment.

East Asia's growth is propelled by private sector dynamism assisted by favorable government policies, and is extended to neighboring countries through foreign investment, management, and technology flows. In contrast, the Russian Far East appears activated mainly by bureaucracy, regional rivalries, competitive politics, and conflicts with Moscow. Capital flight and sell-off of natural resources to facilitate it now attract some of the most ambitious entrepreneurial activity. Extended efforts to launch some of the more promising natural resource developments are largely at an impasse. The cumulative results of extensive investigations by western resource companies into the commercial potential of Russia's mineral resources have been strongly negative. Existing mines and enterprises are far less efficient and higher cost than those of external competitors, maintained by artificial support to sustain them as export earners. Potentials of what mineral resources have been examined in the RFE are severely limited by low metal content and serious infrastructure gaps and weaknesses. Gold deposits (because of relatively low investment

requirements and easy marketability) constitute virtually the only exception. Even oil projects that seemed initially promising, such as in Sakhalin, have been “dogged by bureaucratic delays and legal and fiscal uncertainties.”⁵²

Overall, the RFE appears unlikely to attract significant Asian investment even for natural resource development, and is even more unlikely to become a meaningfully interactive factor (i.e., investor) in the East Asian regional economy by 2010. Even more than western Russia, the RFE lacks experience and familiarity with market-driven and competitive environments, and success in understanding and attracting foreign investment. To overcome those disadvantages would take a change not only to much stronger, more independent RFE leadership, but also to leaders who really understand and appreciate market forces and the intense competitiveness they involve.

Myanmar

Over the past year, limited and tentative indications of a somewhat more outward-looking government orientation have appeared. The ASEAN countries in early 1994 openly espoused new initiatives of “constructive engagement” with Myanmar and claim credit for Myanmar's show of interest in sharing in the benefits of the region's dynamism. Nineteen ninety-four recorded a “wave of foreign business interest” and a large number of visiting business and political delegations, most urging political and human rights reforms in pursuing their more particular interests. U.N., World Bank, and high-level business delegations from Japan and some ANIEs were there. Close observers see signs of “loosening up” or “progress.” Outside of some relaxation of imports, specifics are hard to come by. Probably the most tangible signs are the success of a few foreign companies in signing resource and infrastructure contracts with the government. Most substantial is a \$500 million contract to pipe natural gas from

52. See special section on Russia in the April 10, 1995, issue of *Financial Times*, particularly “Eldorado loses its shine: Western mining houses think again,” VIII. According to a *Christian Science Monitor* radio report on April 10, the Sakhalin oil project has just been approved.

Myanmar to Thailand, a joint venture agreement between Unocal Corp. (U.S.) and the Myanmar government signed in September 1994. In January 1995 a contract was signed for a cellular telephone system for Mandalay.⁵³ Early foreign oil sector investors had discouraging experiences and have withdrawn, but other blocs drew competitive foreign bidders.

Expanding Chinese initiatives to open Myanmar included completion of a new bridge to China and extensive Chinese military aid—a process that suppression of the Karen rebellion will build on.

While there is some prospect for Myanmar to become a slightly more substantial trade partner with the region by 2000, the deeply ingrained socialist dirigisme of the bureaucracy and lack of experience and familiarity with competitive market systems will deter all but the hardest and most adventurous foreign risk-takers. Myanmar's inability to control inflation and the money supply, or to achieve overall economic growth and stability will keep meaningful economic interaction with most Asian economies well beyond its reach through this decade and probably through the next.

That does not preclude some substantial Asian resource investments, especially in oil and gas where marketing and pricing risks are limited. Myanmar's prospects would become markedly better, however, if it implements policies that bring about major expansion of production and export of rice, a commodity in which Myanmar could and should become a major Asian supplier, along with Vietnam.

The ANIEs, tier 2

In 1995 the ANIEs retained almost all the fundamental strengths that gave them their developmental lead: continued high savings rates; consistently low inflation rates (4-8 percent); and strong foreign exchange reserve positions. A broadly accepted test of foreign exchange strength is a 1:1 ratio with reserves adequate to cover 3

53. Marcus W. Brauchli, "Burma May Grow Out of Pariah Status As Foreign Business Interest Expands," *The Asian Wall Street Journal Weekly*, December 5, 1994, 8.

months of imports at current levels, a standard difficult for most developing countries to achieve, except in Asia. Table 15 shows that only South Korea falls short; Taiwan, India, Singapore, China and Thailand double or better.⁵⁴

Table 15. Foreign exchange reserves of Asian economies

	Japan	So Korea	Taiwan	H-Kong	S'pore	Indon.	Mlysia	Phil.	Thail.	China	India
FX reserves	167.50	31.14	100.41	49.28	66.37	13.19	25.39	7.02	33.60	64.23	19.35
3-mo imports	86.33	34.65	27.97	50.51	32.44	10.75	19.90	6.70	17.88	33.58	7.35
Ratio	1.9:1	0.9:1	3.6:1	1:1	2.1:1	1.2:1	1.3:1	1.1:1	1.9:1	1.9:1	2.6:1

Moreover, all see China as a major new trade expansion opportunity. Even so, in terms of regional inter-tier dynamics, the ANIEs are currently in a critical transition period. On the down side, cost-push pressures on their competitive position remain strong, as real wage increases average almost 4 percent a year, a much faster rate than for their Japanese or Mexican competitors. The southernmost three ANIEs are on the high side of office space rental costs. However, in spite of becoming sandwich economies faced with much tougher competition from both more and less developed economies, they have adjusted extraordinarily well on balance. Korea and Taiwan are being pushed by cost competition from China, Malaysia, and Thailand. They must respond to that competition but have also chosen in a broader range of technology industries to compete directly with Japan and the United States.

Remarkable at this particular stage in their development and economic restructuring efforts is the range of different strategies the individual ANIEs have chosen. All but Hong Kong are investing heavily in technology education and research. Hong Kong has expanded emphasis on its services: finance, transportation,

54. Based on data from "PRICES & TRENDS," *Far Eastern Economic Review*, October 26, 1995, 80-81.

marketing, design, communications, and other services that position it as prime intermediary to the world's largest economy in the next century. Both Hong Kong and Taiwan have hollowed out their competitively marginal labor-intensive industries (garments, footwear, toys, umbrellas, and light consumer goods) to an amazing degree, mainly by moving production to China. But Korea has concentrated more extensively than the others on moving its production up the technology and value-added scale. As the yen has appreciated much more rapidly than the won, Korean industries in particular have gained substantial advantage in attacking markets where Japan has long dominated but has now lost its cost advantage, in spite of decline in its own labor cost advantages in the late 1980s.⁵⁵ Korea's industries are challenging particularly those industries that have long been Japan's strongest exporters—automotive and electronics—and will continue to expand their global market shares, beginning in China. Korea has also expanded investments abroad in metal fabrication and chemicals, mainly in Asia.

Also investing heavily at home, Taiwan firms have likewise been remarkably successful in establishing world-class manufacturing, product, and technology offerings. They have achieved several dominant world market positions, remaining longer than Korea in niche markets—first in computer peripherals, but also increasingly in mainstream products such as PCs and notebook computers. However, recently Taiwan has added a major push to become a leading regional headquarters for foreign businesses. This requires Taiwan to make much more extensive and aggressive efforts to liberalize its economy than does Korea's strategy.

Singapore strives to remain the financial and economic center of Southeast Asia. As competition intensifies, Singapore's leadership has concluded that it relied too heavily on foreign investors for entrepreneurship in developing its manufacturing. It has made a major push

55. In spite of its extraordinarily high rate of national savings at 35 percent of GDP, Korea invested so heavily in expanding and enhancing export industries in the mid 1980s that it required extensive capital imports. These resulted in a moderate trade deficit, along with a depreciation of the won from 1985-1989.

to internationalize its investment and to expand its entrepreneurial experience in the region.

Recent ANIE growth rates are generally more moderate than the catch-up economies in tiers 3 and 4. This is not surprising. Three reasons are the competitive squeeze on the ANIEs from both leading and following economies, the resulting decline in its oldest and largest manufacturing industries, and the attrition of earlier growth gains from expansion of labor force participation in manufacturing. However, based on their impressive resilience in responding to an ever-changing competitive environment, this study projects that the ANIEs will succeed in their current transition toward advanced economic status and as a group achieve at least a 6-percent average growth rate through 2010.⁵⁶

Korea

Reinforcing the competitive advantage gained from yen appreciation, Korea's own currency depreciated significantly during the 1980s, in contrast to the Taiwan currency, which remained steady. This took place mainly in the early 1980s when Korea's demand for internal investment outstripped even its high savings rate, as the *chaebol* positioned themselves with capacity to preempt major global shares in autos and electronics. The won's decline added to its competitive advantages as this new capacity disgorged new products onto world markets.

Having hollowed out its manufacturing industry less than Taiwan and Hong Kong, Korea has concentrated more on building control in high-value-added markets in direct competition with Japanese firms, mainly in automotive transport and electronics. It has also more than held its own in several key heavy industries, including shipbuilding where it ranks first in the world, and in machine tools where it ranks fifth. Most outstanding in emerging industries, is Samsung's success in semiconductors, particularly DRAMs. It is expected to become the world's largest producer of DRAMS in 1995, having refined the

56. Hong Kong could prove an exception if reversion to Chinese control goes badly.

technology to achieve what is claimed will be the most advanced memory chip in the market.

In automotive transport, the government has just authorized a fifth domestic producer; once it begins initial capacity production, Korea will become the world's fifth largest automobile manufacturer. With the developing world market for vehicles expected to equal that of the industrial world at 30 million per year by 2010—with China at the forefront—Korea will concentrate on winning a big share of that emerging market rather than trying to win market share from established suppliers and markets in the United States and Europe. Thus, Korea is following largely a manufacturing strategy, which will expand the demand for skilled and semi-skilled workers and generate the highest percentage increase in hourly wages in Asia. By 2000 Korea will take third place behind Japan and Singapore for highest hourly wages in Asia, at a level four times the estimated average level for Mexico and 60 percent that of the United States.

By far the most threatening uncertainty facing South Korea is North Korea. South Korea is acutely sensitive and vulnerable to intense competition from its Japanese, ANIE, and Chinese neighbors. Thus, South Korea will seek to avoid any instant, unregulated absorption of the North, which could significantly undermine its competitiveness. Instead it will pursue approaches that strengthen its competitiveness, such as, for example, contracting to employ low-cost northern labor in production-for-export ventures. One nightmare scenario would be economic collapse in the North with loss of political control. The South would then face having to support the North to prevent chaos and economic turmoil from spilling over its border.

Taiwan

Taiwan has hollowed out many of its most labor-intensive and low-tech industries. Yet by capitalizing on its control of low-cost production of components in China, it has also retained a competitive position in selected textile products. It has also made heavy investments in technology industries and has achieved dominant market positions in numerous computer peripherals and niches such as keyboards, motherboards, and notebook computers, as well as in a great diversity

of other medium- to high-technology products. Yen appreciation has helped Taiwan to sustain competitiveness in a wide product range and to hang on in steel, shipbuilding, and fibre manufacture.

Taiwan's new competitive strategy is to sell itself as a leading regional operations center for foreign multinationals. It can play up, with plausibility, its central location between Northeast and Southeast Asia and its proximity and connections to the mainland. However, to promote its advantages as a financial and communications center is a much tougher sell, since Hong Kong and Singapore are already so well established and Shanghai clearly is bidding to become another contender. Taiwan has developed a substantial and growing market position in air and ocean transportation, however, through its Evergreen family of companies. Its substantially lower projected wage increases compared with Korea reflect Taiwan's plans for emphasizing professional and technology skills and services, and imply less intense demand for workers in manufacturing.

A big advantage of Taiwan's "regional operations center" policy is that it necessitates rapid and extensive liberalization of the economy. Only in this way can it attract major multinationals by offering the same kind of open and unrestricted economy that has attracted such enterprise to Hong Kong and Singapore.

Hong Kong

Although Hong Kong retains significant technology-related manufacturing, its development plans appear to emphasize its business center advantages—product design, marketing, and handling—along with expanding its well-established support services in finance, investment, communications, transportation, media, and information management and processing. Under the "China reform-continues" scenario, Hong Kong stands to continue on this path with little disruption, playing on its advantages as the world's fourth largest financial center. Whether it can sustain current high growth depends mainly on the extent to which China's economic policies continue to allow a major role for Hong Kong and foreign private investment in Chinese infrastructure and industry. If it does, Hong Kong will remain prosperous as it brings its impressive entrepreneurial and

financial strengths to bear on mainland infrastructure projects. However, if Chinese rulers accommodate poorly to the policy requisites of sustaining Hong Kong as a vigorous, healthy financial and entrepreneurial center, the former crown colony will be facing hard times. Judging by Chinese economic policies and decisions toward foreign investors in 1995, which were by turns both promising and unsettling, Hong Kong's prospects appear comparably mixed.

Singapore

Continuing to build on its manufacturing skills in high-tech computer components and accessories, Singapore has sustained high export growth in this sector. At the same time it has continued to thrive and to experience its fastest growth in high-value-added financial services, in which it ranks fifth, just after Hong Kong. Seeing serious limits to growth in what it can do within its limited territory, and already being a regional operations center for innumerable multinationals, Singapore hopes to "regionalize" its economy by developing productive investment assets elsewhere in the region, using state enterprises as the pathfinder. Appreciating the importance of its strategic location astride a critical strait, with interests in developing higher paying uses for the adjacent Riau islands of Indonesia, Singapore may be open to projects in which it can enhance sea lane security while bringing in more revenues from its services.

Overview of ANIE dynamics

Population

As maturing industrialized economies, with a combined population not much greater than Thailand's and with low population growth rates averaging about 1 percent per annum, the four ANIEs benefit from not having to dilute their human resource investments as they try to promote engineering, technology, and other higher value-added skills. The implications of one recent study of the origins of high ANIE growth rates suggest that future ANIE manufacturing productivity gains will be harder and more costly to come by. Rising labor force participation rates, education levels, and transfers of labor from less productive sectors were among key contributors to fast-growing industrial output. Now, however, the ANIEs are close to exhausting

the potentials for increased participation rates and inter-sector transfers. This has led to significant immigration of foreign workers from the Philippines, Malaysia, and other neighbors to meet increased labor requirements.

National savings and investments

Singapore (48-percent savings rate) and Hong Kong are mainly concerned with using their surplus savings in productive investments offshore. Taiwan and Korea are torn between investing to relocate industries in lower-cost Southeast Asian economies and promoting domestic investment in order to expand high-tech industries. Both Korea and Taiwan have now also joined the world community of donors of economic assistance and will no doubt use that role to advance their export marketing interests as well.

Complementarities and competitiveness

In general, the four economies have reached the stage where their needs will be much less in relocating marginal industries offshore than on marketing their technologies, financing, and services to meet the dominant Asian needs for infrastructure and advanced consumer goods, and for financial, communications, transportation, information, and similar upscale services.

Infrastructure and environment

As capital surplus economies, despite a pressing need for infrastructure to keep pace with rapid economic growth, none of the four ANIES faces any significant limits on immediate growth prospects from infrastructure shortages. Taiwan has developed the most elaborate infrastructure plans—a six-year \$300 billion program with some portions open to foreign investment. However, it was forced to cut back and delay some aspects to avoid unwanted deficit financing.

Trade liberalization and regional organizations

With their very strong export market orientation, all four ANIEs are strong supporters of trade liberalization efforts within APEC, and will certainly be among main beneficiaries.

The ASEAN-4, tier 3

The ASEAN-4 and Vietnam economies stand to be major beneficiaries of both the cost-push and the demand-pull dynamics that are attracting large intraregional capital and trade flows from now through 2010. This will be especially true in the reform-continues scenario. In the late 1980s it looked as though the industry relocation baton had passed from the ASEAN to China as skill and infrastructure costs mounted in the ASEAN region, but especially when enthusiasm for China burgeoned after 1991. However, many excesses in China after 1992—inflation, corruption, and cost increases (property, rent, labor, government services, and so on), along with ASEAN efforts to reduce infrastructure and skill shortages—have reestablished ASEAN as a leading contender offering competitive low-cost production sites and infrastructure opportunities. In addition, the ASEAN region has become a major regional market in its own right, attracting investment to satisfy local and ASEAN regional demands.

We are now seeing an intensification of competition between tiers 3 and 4—ASEAN and EMIEs (China and India) for foreign capital. In this new competitive environment, low labor cost, where tier 4 still clearly has the edge, is no longer the main determinant of capital flows. Rather it will be the entire operating cost resulting from the investment package. China clearly won round one in the 1990s. The ASEAN-4 are making a good comeback in round two, but China continues to attract the lion's share of foreign capital flows in Asia. The reform-continues scenario assumes that China will control inflation and resume reforms and promotion of FDI inflows in 2 to 3 years, gaining further ascendancy over ASEAN. However, recent events in China have raised enough concerns about the stability, reliability, and credibility of China's investment climate to cause foreign investors to be more skeptical and cautious about China in the near future, and to be more inclined to hedge their bets and diversify their asset locations. It only requires a diversion to ASEAN of 20 percent or so of 1992-93 FDI inflows to China to constitute a major increase in the flows to ASEAN.

ASEAN-4 fundamentals are sound, particularly now that economic reforms in the Philippines are making headway. All four share the

attraction of moderately lower and slower rising labor costs than the ANIEs, along with more reasonable property and rental costs than either ANIEs or major Chinese municipalities. Because the ASEAN-4 are far from limits to growth in their supplies of labor, energy, and raw materials, and have great needs for foreign investments in infrastructure and equity markets, we forecast continued strong growth for the ASEAN-4, averaging 7 to 8 percent growth for 1995-2010, faster than any other tier in the region. At this rate, the four will roughly triple GDP size by 2010.

Population

Continuing to grow at the comparatively rapid annual rate of roughly 2.4 percent per year, population growth tends to dilute the impact of the ASEAN-4's human resource investments, and adds to food and energy requirements. However, it also provides leeway for expanding labor and productivity in manufacturing and service sectors. Urban population in ASEAN is expected to double from 1985 to 2010, a 3-percent rate of annual growth.

National savings and investment

The Philippines has a good way to go to catch up with its partners, with a national savings rate of only 15 percent, less than half of that of the others. Its recent negative economic growth has left it far behind. The other three, despite extraordinarily high savings rates exceeding 37 percent, still depend on foreign aid, as well as both equity and portfolio investments from abroad. This dependence will continue because rapid population and economic growth generate demand for jobs and infrastructure. Rapid urbanization further intensifies infrastructure demands and need for private as well as government capital.

Complementarities and competition

The ASEAN-4 should be an increasingly attractive area for the capital-rich Japanese and ANIEs over the period to 2010. There will continue to be important opportunities for cost-pushed relocations of production from Japan and the ANIEs. Opportunities for investment in infrastructure are gradually expanding. Energy and resource

development will continue to be important in attracting Japanese and U.S. investments.

The ASEAN-4 realize that they cannot progress by attracting only labor- and land-intensive investments, and are looking to attract value-added investments in technology and engineering industries, including electronics, refining, materials processing, and transportation equipment. They also pursue this path in their desire to catch up with and become one of the Asian ANIEs.

Finally, ASEAN remains one of Asia's best hopes for reducing dependence on energy sources outside the region. In spite of apparent adequacy of long-term oil supply arrangements by consuming nations in the region over the coming decade, Exxon believes that growth in future demand justifies its investment of some \$40 billion in developing one of Asia's largest natural gas fields, in the Natuna Islands of northeast Indonesia.

Infrastructure

Although the combined value of ASEAN infrastructure requirements does not begin to compare with the backlog of needs in China, Japan, or even the ANIEs, the need to resolve this backlog is second only to China's in terms of its potential adverse impact on future growth. Serious power brown-outs shut down industries in Malaysia and the Philippines in 1993, and have been resolved only by emergency interim solutions. Whether infrastructure gaps are eliminated or not will be crucial to determining whether ASEAN or China is more successful in attracting FDI in the future.

Environment

Although blessed with a general abundance of tropical and mineral and energy resources, ASEAN countries are causing major environmental damage in some key areas. Perhaps most critical is the devastation of tropical rain forests and resultant topsoil erosion. Major forests are almost completely destroyed already in the Philippines, a process that is still progressing with speed and abandon in Malaysia and Indonesia. As poor struggling countries, the ASEAN have made an issue over the matter of how the expense for environmental

protection should be shared between developing producer countries and the industrial countries that are major consumers of their products.

Trade liberalization and regional organizations

For almost two decades the ASEAN made little progress toward reducing intra-ASEAN barriers to their own trade exchanges. In the late 1980s ASEAN leaders began to realize that the best reason to reduce barriers is to accelerate development of a region-wide market and corresponding production platform. By so doing they could attract foreign capital to invest in new industries. (Major advantage: there are no vested interests in retaining barriers where industries don't yet exist.) Japan pointed the way in the late 1980s in the automotive and electronics industries. Responding to ASEAN country policies requiring guarantee of a minimum percentage of exports as a condition for foreign investment project approvals, Japan located component manufacture in four or five ASEAN countries according to their comparative costs, with final assembly located according to cost advantages and access to main target markets, whether local or export.

Effective January 1994, ASEAN agreed to accelerate and expand its trade liberalization objectives and efforts, and created a more formal agreement to that end, the ASEAN Free Trade Area. When faced with proposals that APEC should set an objective and date for complete trade liberalization within the Asia-Pacific, ASEAN was split, with both supporters and strong opponents. Indonesia feared that APEC liberalization efforts would dilute the significance of ASEAN, but finally threw its support to the proposal at the November 1994 Leaders summit. ASEAN stands to be one of the greatest beneficiaries of both AFTA and APEC liberalization efforts, and could well gain up to a 0.5 percentage point higher average growth over the period as substantial liberalizations are achieved.

Australia

Australia continues to strengthen its economic ties to Asia, with over half its exports going to Japan and Northeast Asia. Southeast Asian markets are its second largest, ahead of the EC, and are the fastest

growing. More broadly, Australia's new emphasis on becoming an integral part of East Asia is considered the most radical change in its international orientation since World War II. Even so, Australia's direct investment in Asia totals only about \$13 billion to date, representing only 13 percent of its total foreign investments.

A major obstacle to this integration is that the value of the Australian dollar is determined preponderantly by the dominance and strong growth prospects of its mineral and energy (coal) exports. Its high-value, resource-based currency value makes it extremely difficult for Australia to develop manufacturing and service industries that can (1) export competitively or (2) build up the financial and technology strengths from which to make foreign investments. Not surprisingly, Australian manufacturing is only about half as important relative to GNP as in most Asian economies.

Australia's location at the far south and east corner of the region also adds distance and cost to the obstacles that limit its integration into the region. Even so, the rapid and extreme escalation of urbanization and associated property, office, residential, and other urban business costs in Asia's tiers 1 and 2 have increased Australia's relative attraction as a location for the Asian regional headquarters for some 65 multinationals, as well as for location of data processing and other types of communications-based support functions. Its telecommunications infrastructure, skilled work force, and managerial skill pool have added to this appeal.⁵⁷

Nevertheless, Australia will continue to be a magnet mainly for Asian and other foreign investments in its energy and mineral resources. No matter how hard it tries, it will remain essentially a reactive economy dependent on changes or prospective changes in the level of Asian demand for its leading commodities. The complementarities it offers to other Asian economies will continue to be based predominantly on natural resources. Its national savings rate is only just over half that of the average Asian economy. Thus, it has limited ability to participate in or contribute to the interactive dynamics of the region

57. Jacqueline Rees, "Opportunities of Oz: Australia beckons as a regional headquarters," *Far Eastern Economic Review*, December 29, 1994, 92.

by becoming a significant capital investor in the same way that countries included in the top three tiers can do.

Still, Australian growth will continue to benefit from Asia's strong and rising demand for natural resources. It is expected to grow at roughly a 2.5 to 3 percent rate over the next 10 to 15 years. Also, Australia will be a significant factor in the expansion of sea-going traffic in East Asia, as the resource needs of Vietnam and China grow. "About 60 percent of Australia's exports, including coal, iron ore, bauxite, alumina and liquefied natural gas, pass through the Indonesian archipelago on the way to East Asian markets."⁵⁸

58. John McBeth, "Troubled Waters: Proposed sea lanes spark concern," *Far Eastern Economic Review*, December 29, 1994, 18.

Appendix C: Transnational growth areas

The concept of so-called "growth triangles," which cut across the country boundaries to create economic zones transcending national borders, has risen to prominence, mainly since 1989. The two successful examples on which this concept is modelled center on Singapore and Hong Kong. These two successes reflect the preeminent role that private enterprise and aggressive foreign investment in these two central core economies have played in advancing the process of economic integration in Asia, to the extent of virtually obliterating local national boundaries with regard to economic transactions. From these two dynamic core economies, foreign investment has flowed across adjacent national boundaries to create broader growth areas. Robert Scalapino has called these areas "natural economic territories," or NETs. However, they are not natural in this sense: one cannot define in advance how far they extend from their dynamic cores. What these growth triangles do, however, is to demonstrate rather dramatically the magnetism of strong complementarities that exist between capital-surplus core economies and under-developed adjacent areas of neighboring economies, which may extend more or less broadly depending on the circumstances.

One of these areas centers on Singapore. In one direction, Singapore has invested heavily in the adjacent Malaysian state of Johor, achieving a close coordination between microelectronic assembly, packaging, and other labor-intensive processes done in Malaysia, and their integration into final product in Singapore. In another direction, Singapore, with Indonesian encouragement, has played a central role in developing two sizeable Indonesian islands of the Riau group located close by, to include tourist facilities, industrial zones, and other facilities for which Singapore no longer has disposable land. Japanese, Singaporean, and Indonesian investors are involved. This Singapore-Johor-Riau (or Sijori) triangle is in reality not a triangular but rather a hub-and-spoke relationship, since there are no significant Indonesian-Malaysian investment flows between Johor and the Riau areas.

The second area centers on Hong Kong. The opening of special economic zones (SEZs) in China, especially across its immediately adjacent border in Shenzhen, provided irresistible opportunities for Hong Kong to move its plants across the border to take advantage of cheap labor and land, while retaining design, marketing, financing, and other business functions in Hong Kong. For political reasons, Taiwan channels its trade with and investment to the mainland through Hong Kong, but severely limits imports from China. In turn, billions of dollars of Chinese money has flowed into or through Hong Kong, either as flight capital in search of greater political or economic security, or to join with offshore Chinese capital and re-enter China to take advantage of special incentives that have been afforded "foreign" capital.

This Hong Kong-Taiwan-mainland nexus has been dubbed "Greater China," reflecting the notion that this process might eventually bring about a virtually full integration of the three. In the event, it has gone so far as to cause an estimated one-third of Hong Kong's currency to circulate as an effective means of exchange in Guangdong province. It is even more a misnomer to call this area or relationship triangular, or even hub-and-spoke; it is essentially a one-way axis, with capital flowing from Taiwan to Hong Kong, and to China through Hong Kong, without any investment or even much trade flowing back to Taiwan. The closest it comes is to a circular flow of capital back from China to Hong Kong.

The so-called Singapore growth triangle has probably already achieved its greatest territorial extension and should continue now to grow modestly within those territorial limits.

The future of the Hong Kong area "triangle" is hostage to its 1997 reversion to Chinese control and to the evolution of Taiwan-mainland relations. If China remains on an active reform path, Hong Kong should continue to serve as development catalyst to an area of the mainland that has room to expand both northward and westward. Whether Hong Kong continues to be the conduit for cross-Strait investment and trade flows between Taiwan and the mainland after 1997 depends on the extent to which Taiwan and the mainland establish direct trade, travel, and communication links.

These two successful growth triangles exist and flourish because private sector entrepreneurs have seen opportunities to make profitable investments and because political authorities in adjacent economies are willing to make certain accommodations in territorial sovereignty in the interest of encouraging economic development of areas that might otherwise grow much more slowly. These authorities are prepared to allow investors from the core economy special liberties to invest in ways that bring about a transnational integration between one economy and part of one or more other economies.

The success and appeal of these two areas have inspired ambitions for additional transnational areas in East Asia (table 16).

Table 16. Some transnational growth areas

Functioning

Singapore growth area: Singapore, Johore (Malaysia), and certain Riau islands of Indonesia

"Greater China": Hong Kong, Taiwan, Shenzhen economic zone, other Guangdong province

Envisaged

"Northern growth area": Penang (Malaysia), northern Sumatra (Indonesia), southern Thailand

"East ASEAN growth area": Brunei, Sabah and Sarawak (Malaysia), Kalimantan (Indonesia), Mindanao (Philippines)

"Tongking economic cooperation zone": Southeast China, Laos, Vietnam

"Tumen Jiang [river] economic zone": Yenching (China), Vladivostok (Russia), North and South Korea, Japan

"Mid-ASEAN growth triangle": Davao (Philippines), Sandakan (Malaysia), Sulawesi (Indonesia)

"Pan-Yellow Sea triangle": Western South Korea, Shandong and Liaodong peninsulas (China), Khushu & Yamaguchi prefectures (Japan)

"South Indo-China triangle": Thailand, Cambodia, Vietnam

"Baht economic zone": Thailand and southern Vietnam

Source: Based on list prepared by Professor Sarosh Kuruvilla, Cornell University School of Industrial and Labor Relations, for the Committee on Changing International Relations, the National Planning Association, held in Boston, MA, on November 4, 1994.

These growth areas might be of special interest if they seem likely to speed the growth of or spread to wider adjacent areas, to be widely imitated, or to set a pattern for broader subordination of border restrictions in the interests of greater synergism between adjacent economies. Although the scope of the Greater China growth area could certainly expand, it is hard to see evidence of any of the other areas as successful imitators. The one possible exception is the pan-Yellow Sea area, where opportunities in the Shandong and Liaodong areas have special natural attractions for proximate Japanese and Korean investors, and some special political relationships might consequently emerge.

The others, however, lack a dynamic core economy that will serve as entrepreneurial catalyst and financial base to bring them into being. They are more in the nature of planner-proposed solutions to areas with multinational potentials. Two that are notable focus on potentials for developing river basins: the Tumen River (Tumenjiang) between China and North Korea; and the Mekong River basin between Thailand, Laos, Cambodia, and Vietnam. In both these cases the United Nations Development Program is acting as catalyst to stimulate cooperation among the relevant political entities and to help finance infrastructure to attract multinational capital and investments. These and other proposed growth areas generally lack conditions fostering spontaneous entrepreneurial efforts that typically enlist local political acquiescence and cooperation. There is yet to emerge sufficient spontaneous interaction or planning momentum to make any of these areas convincing prospects as high-growth regions within the period preceding 2010.

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